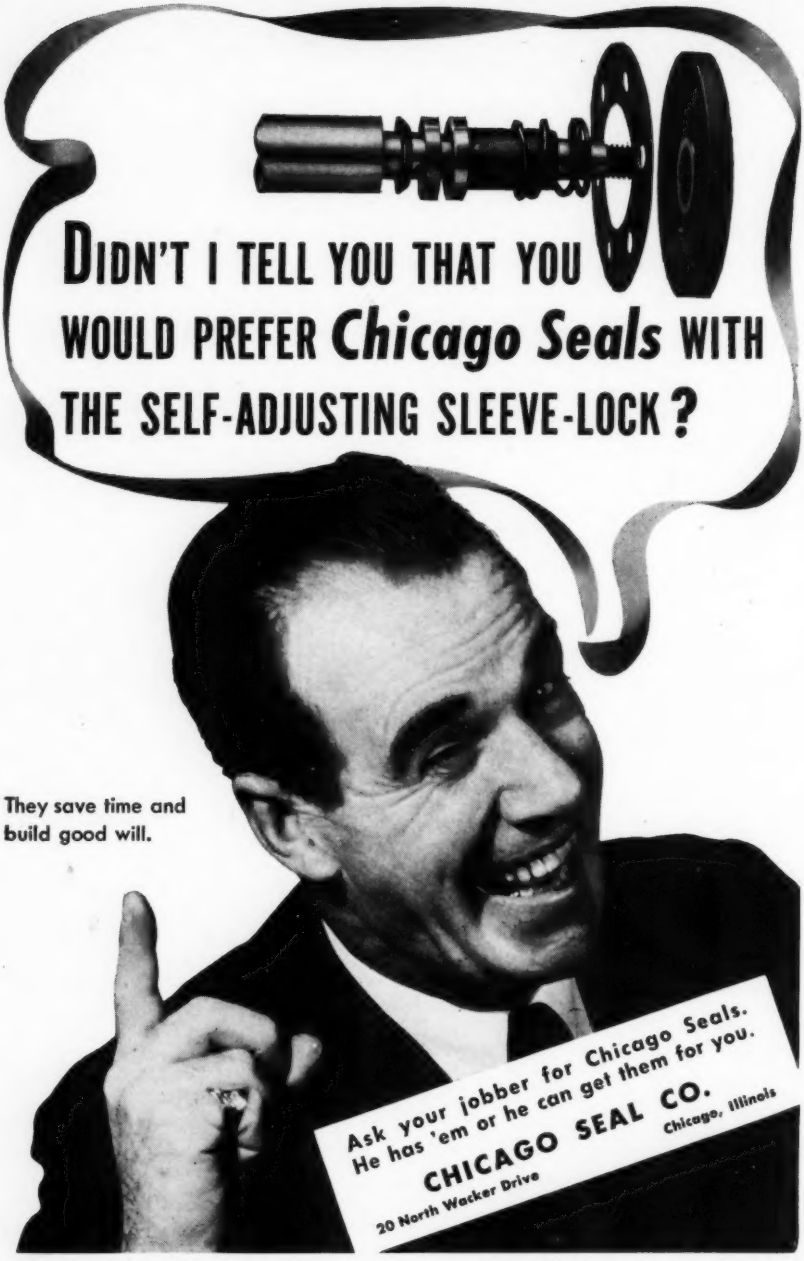
The Refrigeration Service Engineer

TECHNOLOGY DEPT.
MAY 9 1945
DETROIT

VOL. 13 NO. 4 ★ ★ ★ APRIL . 1945

GOVERNMENT RULINGS • SERVICE POINTERS •
DEHYDRATING REFRIGERATION PARTS WITH AIR •
COMMERCIAL SELLING FEATURES • SOCIETY NEWS •


DIDN'T I TELL YOU THAT YOU WOULD PREFER Chicago Seals WITH THE SELF-ADJUSTING SLEEVE-LOCK?
They save time and build good will.
Ask your jobber for Chicago Seals. He has 'em or he can get them for you.
CHICAGO SEAL CO.
20 North Wacker Drive
Chicago, Illinois

THE REFRIGERATION SERVICE ENGINEER, Nickerson & Collins Co., Publishers, 435 N. Waller Ave., Chicago 44, Ill. Published monthly, Vol. 13, No. 4, April, 1945. Entered as second class matter March 4, 1938, Chicago, Ill., under the Act of March 3, 1879. Subscription in the United States, $2.00 per year; all other countries, $3.00 per year.

COLD FACTS BY ANSUL

REFRIGERATED SHIPS AND **DEHYDRATED FOOD** SAVED ENOUGH CARGO SPACE TO **FRUSTRATE HITLER'S 1941 SUB CAMPAIGN.** THOUGH SOME WERE SUNK, THOSE REACHING ENGLAND CARRIED TRIPLE PRE-REFRIGERATION CARGOES.

TWO IMPORTANT CONTRIBUTIONS TO REFRIGERATION AND FOOD PRESERVATION DEVELOPED BETWEEN WORLD WAR I AND WORLD WAR II ARE... **ANSUL LIQUID SULFUR DIOXIDE,— ANSUL LIQUID METHYL CHLORIDE...** IMMEDIATELY AVAILABLE

Our technical book, "Ansul Refrigerants" (3rd Edition) available upon request

ANSUL CHEMICAL COMPANY, MARINETTE, WIS.

"Now in our 30th year"

AGENTS FOR KINETIC'S "FREON-11," "FREON-12" AND FREON-22"

SOME PEOPLE DON'T USE DETROIT VALVES!

Like the Eskimos for instance. Since nature provides their refrigeration, they don't care a good dried fish about Detroit Expansion Valves. They, like mil-

[illegible] thousands of refrigeration men, however, the name "Detroit" is nearly as familiar as their own. "Detroit" is synonymous with reliability and complete satisfaction. The widespread and enviable reputation of "Detroit" valves is attested by the

If you, unlike our Eskimo friends, are interested in outstanding expansion valve performance,

their refrigeration, they don't care a good dried fish about Detroit Expansion Valves. They, like mil-

To thousands of refrigeration men, however, the name "Detroit" is nearly as familiar as their own. To these men, who *do* care about expansion valves,

plete satisfaction. The widespread and enviable reputation of "Detroit" valves is attested by the

If you, unlike our Eskimo friends, are interested in outstanding expansion valve performance, specify "Detroit".

HERE ARE A FEW MEMBERS OF THE FAMOUS DETROIT LINE

No. 897 Dura-fram Thermostatic Expansion Valve for commercial applications. Compact and easy to install.

No. 788 Dura-fram large capacity Thermostatic Expansion Valve, with No. 790 Distributor, showing the distributor tubes and equalizer connection.

No. 673 Thermostatic Expansion Valve. For many years the standard of the refrigeration industry.

No. 899 New Dura-fram Thermostatic Expansion Valve for commercial installations. Furnished with external equalizer and forged union connection.

No. 793 Differential Temperature Expansion Valve specially designed for temperatures below *minus* 30° F.

DETROIT LUBRICATOR COMPANY

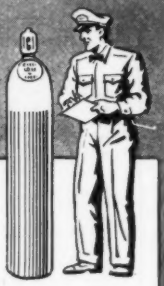
General Offices: DETROIT 8, MICHIGAN

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

Canadian Representatives—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, MONTREAL, TORONTO, WINNIPEG

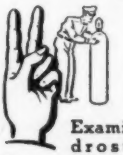
"DL" Heating and Refrigeration Controls • Engine Safety Controls • Safety Float Valves and Oil Burner Accessories • Radiator Valves and Balancing Fittings • Arco-Detroit Air and Vent Valves • "Detroit" Expansion Valves and Refrigeration Accessories • Air Filters • Stationary and Locomotive Lubricators.

Service Engineers Should Know...



How To Determine The Approved Maximum Filling Capacity Of An Empty Cylinder.

1. Refer to the I. C. C. classification number stamped near the top of the cylinder. Any of the following can be used for transporting Sulfur Dioxide, Methyl Chloride, "Freon-12" and "Freon-22": (ICC-3A-300; ICC-3B-300; ICC-4A-300; ICC-4B-300; ICC-4; ICC-25; ICC-38; ICC-26-300.) If any other number is stamped on cylinder, consult Bureau of Explosives before using in refrigerant service.



2. Examine the hydrostatic test date which should be within the prescribed 5 year period. If last test was made more than 5 years ago, send the cylinder for retest to a refrigerant manufacturer or an agency authorized to conduct such tests.

3. Open valve to remove any residual pressure. Remove valve, weigh the empty cylinder; fill completely with water and reweigh. Deduct empty cylinder weight from water-filled weight to obtain net weight of water.

4. Calculate the approved maximum filling capacity by multiplying the net water weight:

— by 1.25 for SO_2
— by 0.75 for Methyl Chloride
— by 1.19 for "Freon-12"
— by 1.05 for "Freon-22"

Caution: Be sure cylinder is clean and dry before refilling with refrigerant.

Manufacturers of "Virginia" Refrigerants and Agents for Kinetic's "Freon-12"—"Freon-22"—"Freon-11"

VIRGINIA Smelting Co.

WEST NORFOLK, VIRGINIA

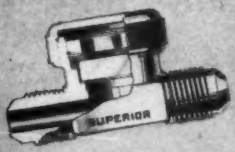
76 BEAVER ST., NEW YORK 5 :: 131 STATE ST., BOSTON 4

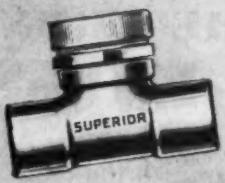
Superior

"Non-Chattering" CHECK VALVES

AND

LIQUID INDICATORS

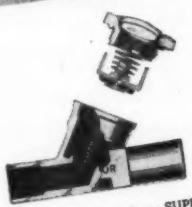




SUPERIOR CHECK VALVES—unique design, positive acting, spring-operated—cannot chatter, hum or buzz under any normal operating conditions. Pressure drop is negligible. Install one in the suction line of each low temperature circuit of all low temperature jobs—your assurance of maximum performance and trouble-free operation.

SUPERIOR LIQUID INDICATORS—call them liquid indicators, sight glasses, or refrigerant shortage detectors—one should be installed in the liquid line of each system. Seal cap over sight glass is double assurance against damage and leaks.

Note these exclusive features



The novel design of these SUPERIOR Check Valves permits the easy removal of all internal parts—as a unit—while soldering lines to valve connections, or for subsequent inspection.

Entire upper assembly of SUPERIOR Liquid Indicators—in all sweat sizes—may be removed as a unit to preclude damage by heat while soldering lines to body connections.

If you haven't a copy of Catalog R2, request one today

No. 111

SUPERIOR VALVE & FITTINGS COMPANY

PITTSBURGH 26, PENNSYLVANIA

OFFICES IN PRINCIPAL CITIES · WEST COAST STOCK LOS ANGELES (15) · JOBBERS EVERYWHERE

HE'S RUNNING AWAY FROM A WET SITUATION, *but* . . .

. . . the grim urgency of the matter will bring him back to finish the job.

Unlike the retreating youth, the wise refrigeration service engineer on a moisture case would simply reach for the TZ and, in nine out of ten cases, the trouble would be over in short order. He wouldn't have to come back. He'd be on his way to the next call.

Time-saving, gasoline-economizing, profit-paying TZ is waiting for the progressive engineer at the store of the live jobber. Stock it today.

"The Moving Dehydrant"

THAWZONE

Fully Protected by U. S. Patents

The PIONEER FLUID DEHYDRANT

HIGHSIDE CHEMICALS COMPANY

195 VERONA AVE.

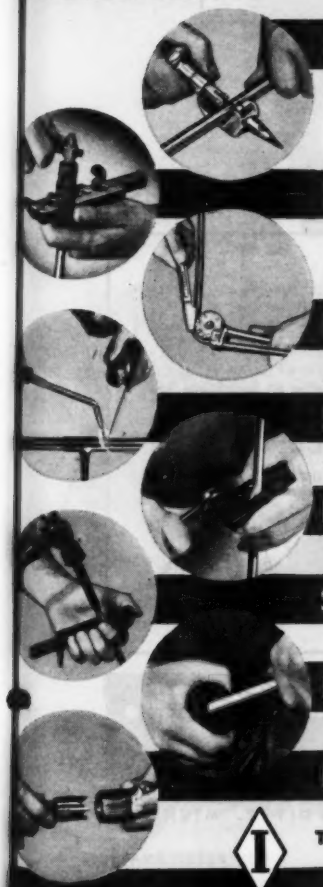
NEWARK 4, N. J.

Speed your tubing connection work with Imperial Tools

The first step in any tube working job is to have good tube working tools—tools that are well-designed, well-made, durable and that make it easy to do *faster* and *better* work. Imperial makes tools like these—and no others. Whatever your tubing job may be, depend on Imperial—the tubing service line that's complete.

See your jobber.

USE THIS HANDY TUBE WORKING TOOL SELECTOR . . .

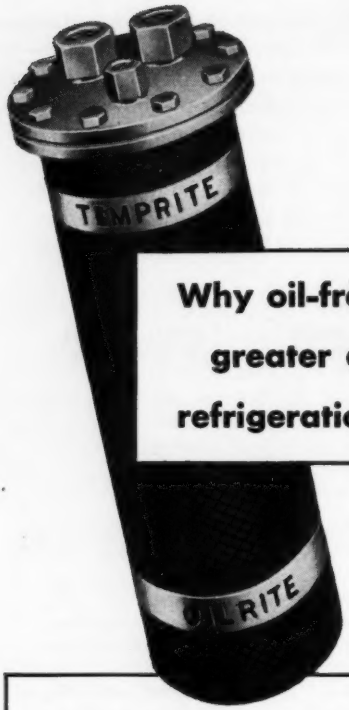


SIZE TUBING SERVICED	SPECIAL FEATURES OR DESCRIPTION	CATALOG NUMBER
3/16" to 3/4"	Roller-type, with flare cut-off groove	174-F
3/4" to 1 1/16"	Roller-type, with flare cut-off groove	212-F
1/8" to 3/4"	Small, pocket-size cutter	127-F
5/16" to 2 3/8"	Sawing vise	184-F
1 1/2" to 4"	Sawing vise	185-F
3/16" to 1/2"	Has quick slip-on yoke	193-F
1/4" to 5/8"	Has quick slip-on yoke	195-F
1/4" to 5/8"	Self-clamping type	295-FS
3/16" to 3/4"	Wide range type	175-F
3/16" to 1/2"	For smaller range of diameters	93-F
1/4" to 5/8"	For smaller range of diameters	95-F
3/4" to 1"	For larger sizes	103-F
3/16" to 1/2"	For double-flaring metal tubing	93-FB
3/8" to 3/4"	For double-flaring plastic tubing	175-FP
1/4" to 5/8"	Set of 6 spring-type benders	101-F
3/16" to 3/4"	Open-side bender. Positions anywhere on tube. Individual bender for each size	364-F
3/8" to 3/4"	Heavy-duty bender outfit	360-F
For use on all solder fitting work.	Outfit includes torch, 4 tips, soldering iron, 6 ft. hose and tank connections	32
1/4", 3/8", 1/2"	Hex nut adjusters. Has holes for re-rounding tubing	105-F
1/4", 3/8", 1/2", and 5/8"	For joining tubing without fittings. Kit includes flaring bar, 4 swedging tools, packed in steel case	195-S
1/4" to 3/4"	Individual swedging tools—no bar	93-S
3/16" to 1 1/2"	For reaming both inside and outside edges of tubing	208-F
1/4" to 5/8"	Tool for refacing S. A. E. flare seats which become nicked or marred. Includes cutter, 5 adapters	98-F

THE IMPERIAL BRASS MFG. CO., 534 S. Racine Ave., Chicago 7, Ill.

IMPERIAL

FITTINGS • VALVES • DEHYDRATORS
FILTERS • FLOATS • CHARGING LINES
TOOLS FOR CUTTING, FLARING, BENDING, COILING, PINCH-OFF AND SWEDGING



Why oil-free coils mean greater efficiency in your refrigeration system

When you apply a TEMPRITE "Oilrite" Automatic Oil Separator to any refrigeration system, you can expect these results:

- The refrigerant will remain at its true boiling point when undiluted by oil.
- Speed of heat transfer frequently increased up to 20%.
- Crank case oil level is constant . . . no scored parts.
- Oilrite Separator positively removes dirt and scale.
- Expansion valve operates more efficiently.
- Low temperature installations easily reach from four to seven degrees lower without increased operating time.

Note: *Complete line of Adapter Block Assemblies available to facilitate installation of Separators.*

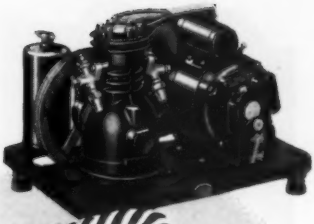
CAPACITIES:
one-sixth h.p. to sixty tons

Write today for descriptive bulletins and prices.

TEMPRITE PRODUCTS CORP.

Originators of Instantaneous Liquid Cooling Devices

45 PIQUETTE AVENUE DETROIT 2, MICHIGAN

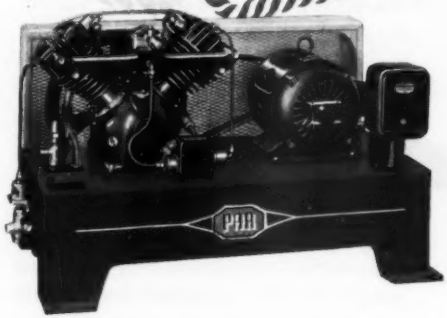


PAR Gives "BLANKET COVERAGE"

in Models and Sizes for Economical, Efficient Refrigeration

FROM 1/6 TO 5 H.P.

PAR BY Lynch



YOUR Par Jobber has Complete details on the Par line of Condensing Equipment. See him for full information or write for Par catalogue R-96 and supplement R-96A.

PAR—Condensing Unit Line sold exclusively through Franchised Refrigeration Supply Jobbers!

PAR Lynch DIVISION

. . . By Comparison — You'll Buy PAR

Manufacturing Corporation, Defiance, Ohio U. S. A.

REDUCE YOUR OPERATING COSTS WITH THE "LITTLE GIANT" PURGER

The "Little Giant" Purger is an essential item and a profitable investment that quickly pays for itself because:

It reduces power costs
It saves expensive refrigerant
It reduces wear and tear on equipment

It is particularly important that any refrigeration system be purged after a shut-down period of any considerable time. The usual practice is to pump the refrigerant back into the receiver and lock it in by means of valves. Repairs or alterations are made on the system during this time, and it is practically impossible to evacuate the system completely, with the result that the remaining air will cause excessive head pressures.

There is no guesswork when you have the "Little Giant" Purger on the job. The sight glass gives visible evidence of non-condensable gases in the system. There is no loss of refrigerant. It is simple to operate and the reduction in power costs will pay for it many times over. Write us for full particulars and instructions for installation and operation.

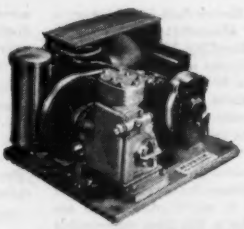
MUELLER BRASS CO.
PORT HURON, MICHIGAN

Customer: *"What's going on here?"*

Salesman: *"Even the cheese has been contented since we installed our new Kelvinator Condensing Unit!"*

More dependability . . . more economy . . . more performance! This has been the result of Kelvinator's 30 years of leadership in engineering, designing and manufacturing of condensing units. That's the reason progressive service men *always* specify Kelvinator!

Kelvinator distributors and zone offices stock a complete line of refrigeration supplies. See them for your installation material such as valves, controls, dryers, etc.



Kelvinator

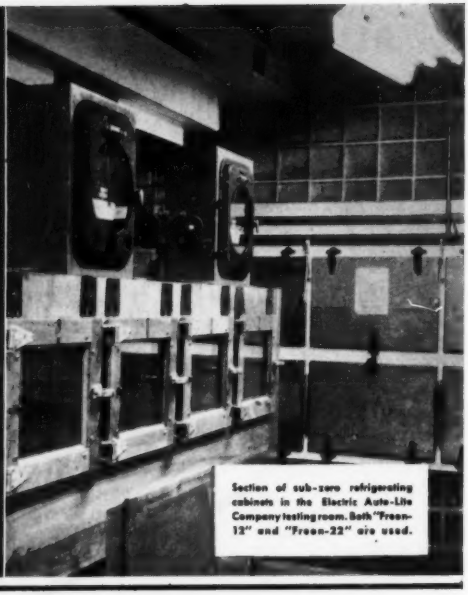
DIVISION OF NASH-KELVINATOR CORPORATION, DETROIT

CONDENSING UNITS

SEALED · OPEN

For Your Home—Remember Kelvinator Refrigerators, Electric Ranges, Water Heaters and Home Freezers.

Another important job for "FREON-22"



Section of sub-zero refrigerating cabinets in the Electric Auto-Lite Company testing room. Both "Freon-12" and "Freon-22" are used.

. . . maintenance of extreme low temperature in testing aircraft precision instruments

AT THE Electric Auto-Lite Company's Bay Manufacturing Division plant in Bay City, Michigan, "Freon-22" facilitates maintenance of temperatures to —65° F. Stratospheric temperatures such as these permit the accurate testing of precision instruments used in today's powerful, high-flying airplanes.

A moisture-resisting, glass-block room encloses the specially designed cabinets in which instruments are tested. Air in this room surrounding the cabinets is held at +70° F. with dew-point of —65° F.

Outside of the glass-block room two Carrier 7-K condensing units with desiccating units are employed to maintain the above temperatures and the dew-point of the air.

Typical refrigerating test cabinets and control instruments are shown in the picture above. Beyond, at the right, is one end of the block-enclosed room. Receiving cabinets in the wall serve as an interlock between production departments and the testing room, and these facilitate maintaining dry air required in the room.

Instruments are tested at temperatures ranging from —35° F. down to —65° F. "Freon" refrigerants are used exclusively. "Freon-12" provides the higher temperatures, while "Freon-22" is used to maintain the extremely low temperatures.

Whenever sub-zero temperatures are required for commercial or manufacturing purposes, food processing or locker plant operation, air conditioning and refrigerating engineers can depend fully upon "Freon" refrigerants for satisfactory and safe refrigeration at moderate cost. These refrigerants will have many new post-war applications. So include "Freon" in your plans for the future. Write today for complete information. Kinetic Chemicals, Inc., Tenth and Market Sts., Wilmington, Delaware.

. . .

"Freon" refrigerants are widely used in heavy duty air conditioning and refrigeration systems.

WAR BONDS HELP BRING VICTORY NEARER
. . . BUY THEM REGULARLY.

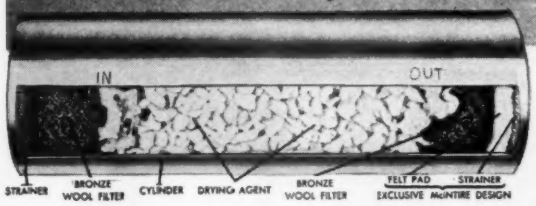
KINETIC

FREON safe refrigerants

REG. U. S. PAT. OFF.

"Freon" is Kinetic's registered trade mark for its fluorinated hydrocarbon refrigerants

ONE DFN CARTRIDGE does THREE Jobs!



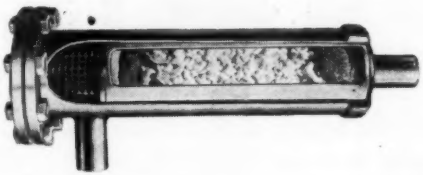
DRIES!
FILTERS!
NEUTRALIZES!

The triple-action DFN System insures 100% protection against moisture, sediment and acid. It stays on the line longer. It is easier, faster to service. Costs less to maintain. When you get all that in *one* unit, why settle for less in a series of units?

The DFN System comprises an inexpensive cartridge quickly installed in an outer shell that is used again and again. Mechanically-packed, hermetically-sealed DFN Cartridges are easily replaced, provide full-strength dehydration because, unlike loose drying agents, they do not absorb moisture from the air while being serviced.

An exclusive DFN strainer and filter assembly covers the *complete area* of the outlet and inlet with multiple layers of wire mesh, bronze wool and felt . . . holds more sediment without pressure drop . . . filters to minute size. Ask your distributor or write us for Catalog R-7.

Standard DFN Demountable Dehydrator shell and cartridge assembly for flexible line installations.

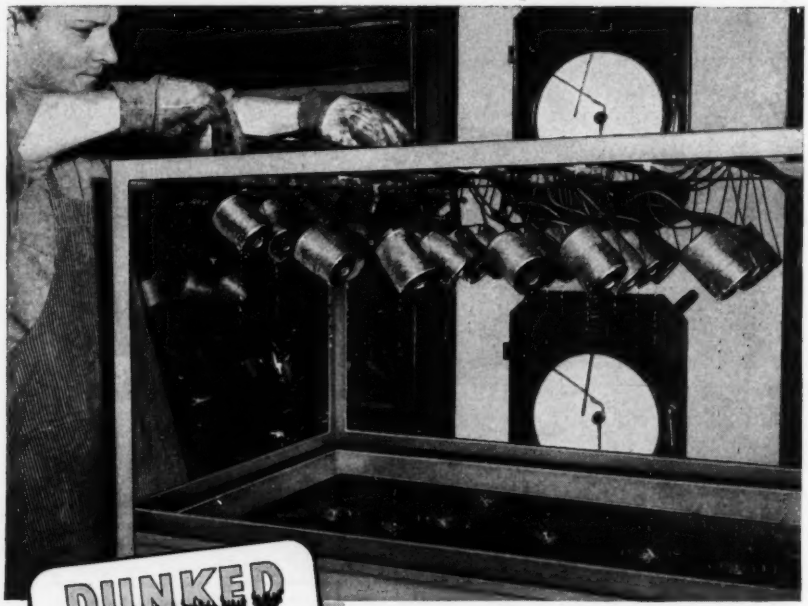


DFN Angle Type Demountable Dehydrator for sweat tube or rigid lines. Cartridge quickly replaced without removing unit from line.

McINTIRE CONNECTOR COMPANY, NEWARK 5, N. J.

Only the **DFN** SYSTEM DEHYDRATES FILTERS NEUTRALIZES

DEHYDRATORS • STRAINERS FILTERS • NEUTRALIZERS



Sounds like a sticky procedure, but it means more dependable solenoid performance

Yes, it's actually dunked in goo. The "goo" is the finest insulating varnish available, and into it, for a good "dunking," goes every coil intended for an Alco Solenoid Valve.

During the "dunking" process, the insulant finds its way into every tiny crevice of the coil, efficiently sealing it against moisture.

After several "dunkings" and trips through the baking ovens, plus a series of exacting tests, the coil is ready for installation in your Alco Solenoid Valve.

This thorough insulation is another reason why Alco Solenoid Valves can be depended upon for the trouble-free performance that gives you efficient refrigeration. See your Alco jobber, Alco Valve Company, 857 Kingsland, St. Louis 5, Missouri.

ALCO VALVE COMPANY

Designers and manufacturers of Thermostatic Expansion Valves; Pressure Regulating Valves; Solenoid Valves; Float Switches; Float Valves.

857 Kingsland Ave. • St. Louis 5, Mo.

Improved PACKLESS VALVES

"Simplicity" Packless Valves

- ...have round hand wheels for easy hand grip
- ...have flat steel springs for positive spring action
- ...have raised body seat that controls travel of stem
- ...have uniformly level connections for ease in installation
- ...have unusually low overall height, reducing required installation space
- ...have multiple diaphragms, a construction outlasting any other possible combination

Free

Write today or phone any branch office for our new, fully illustrated Refrigeration Catalog.

This Weatherhead product is an outstanding example of the engineering "know-how" with which we have endowed all our refrigeration parts. The "Simplicity" Packless Valve was designed-in-use to insure economical long life and trouble-free operation. This product is available in a wide variety of sizes, both flared and solder types.

Look Ahead with **Weatherhead**

THE WEATHERHEAD COMPANY, CLEVELAND 8, OHIO
Plants: Cleveland, Columbia City, Ind., Los Angeles, Canada—St. Thomas, Ontario

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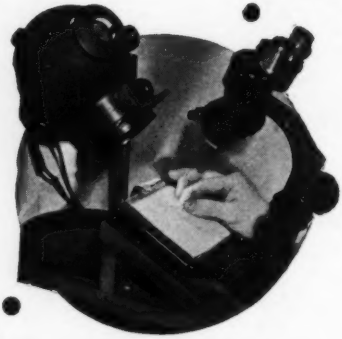
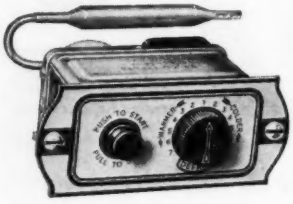
MICROSCOPIC INSPECTION...



... Another reason why Ranco Refrigeration Controls function perfectly . . . are dependable and accurate



MOST people associate the microscope with the microbe hunter in his search for microscopic organisms that cannot be detected with the naked eye. Ranco uses a similar instrument in the manufacture of precision refrigeration controls. This enables Ranco inspectors to detect infinitesimal flaws in various parts that might, if not discovered and rejected, impair the proper functioning of the control. When such extreme care is exercised in the production of Ranco Controls, is it any wonder that they give better than satisfactory performance? That is why you can rely, when you use Ranco Controls, on their dependability and accuracy.

WORK WITH YOUR RANCO JOBBER

Ranco Inc.

COLUMBUS 1, OHIO

The Refrigeration Service Engineer

Vol. 13 No. 4

April, 1945

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems

Official Organ
REFRIGERATION SERVICE ENGINEERS SOCIETY

The Cover

A busy place is the shop of Refrigeration Maintenance Corporation, Chicago, Ill., which has been exchanging or rebuilding refrigeration equipment for 15 years. Story on page 88.

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420 Lexington Ave., New York 17
Telephone Lexington 2-4816

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MR. MANUFACTURER, ARE YOU ON THE SPOT FOR NEW IDEAS?

PERHAPS we can help you... Are you on the lookout for improvements that will make it easier for you in fast postwar competition?

Do you find new refrigeration developments within your business difficult because of the pressure of war work?

Do you find it impossible (as most of us do) to satisfactorily carry out three or four full-time jobs at one time?

In other words, are you on the spot? If you are, we may have an answer for you.

To meet the coming large postwar market, Tecumseh has designed units that fulfill the requirements of the smallest enclosures for apartment use up to room size storage units for farms, restaurants, hotels and large institutions.

We are manufacturing the finest type compressors and condensing units on the market today as a result of high precision machining processes and our engineering department is staffed with well seasoned refrigeration men who are ready to assist you if you'll just say the word.

Why not write us right now for further information?

Chieftain

TECUMSEH PRODUCTS CO.
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IN THIS ISSUE—

Government Bureau news and rulings of interest to the refrigerating industries are summarized in the article on page 20.

The series of articles on the construction, operation and servicing of Coldspot refrigerators is continued in the fifth article on page 29.

Dehydration with Air is the theme of a timely topic presented on page 23 by R. L. Hendrickson who gives the fundamentals of drying by using air and offers suggested hook-ups for accomplishing the desired results.

The sixth article by Paul Reed on service men going into business for themselves takes up the very important question of financing a refrigeration sales and service business. See page 26.

War conditions have made it necessary for many commercial service firms to go into the domestic field. How a California repair shop met this problem is told in the article on page 35.

Practical ideas and hints on servicing and repair work will be found in the Service Pointers Section starting on page 33.

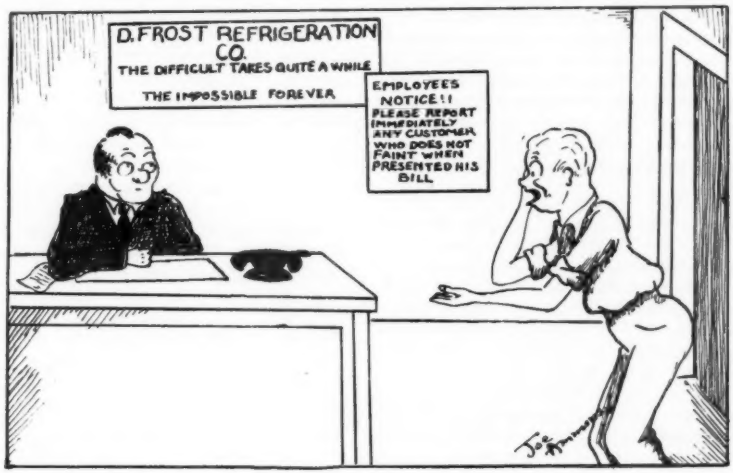
A new device for marketing frozen foods in self-service stores, has been developed by a Denver concern. See story and pictures on page 37.

An educational conference was held by the Canadian Chapter R.S.E.S. at Montreal, Canada March 18 and 19. Report of this meeting starts on page 52.

The background of electric refrigeration and the progress of refrigeration service the last 25 years was the subject of an interesting paper by Paul Reed at the Canadian Conference. It is published in full starting on page 62.

Developments point to a tremendous market for home freezers. The future of this new industry was the subject of another paper at the Canadian Conference, by C. W. Stoner of Ben Hur. See page 56.

I have to see a doctor! I must have a vacation!
A woman just mistook me for a radio service man!


D. FROST REFRIGERATION CO.
THE DIFFICULT TAKES QUITE A WHILE
THE IMPOSSIBLE FOREVER
EMPLOYEES NOTICE!!
PLEASE REPORT IMMEDIATELY ANY CUSTOMER WHO DOES NOT FAINT WHEN PRESENTED HIS BILL

Government Bureaus—*News and Rulings*

RULINGS and announcements issued by the various Government Bureaus that are of general interest to the refrigeration service industries are summarized below. Only the essential facts are given in most cases, and those who desire further or more complete information on any specific regulation or announcement are advised to write the proper Government agency.

S S S

Freon Restrictions Lifted

RESTRICTIONS on the delivery and use of Freon-12 for air conditioning and certain types of refrigerating systems were removed April 2 by the War Production Board which provided, however, that precedence be given to orders for F-12 gas for installation in systems of more essential users, who are not on List A of Conservation Order M-28. Action was taken by amending Order M-28.

Adequate supplies of F-12 gas should continue to be available if the gas cylinders are returned with reasonable promptness, officials of WPB's General Industrial Equipment Division said. Failure to have empty cylinders returned to the F-12 gas producer could result in the necessity for reimposing restrictions, they said.

The amended Order M-28 provides that cylinders for the air conditioning or refrigerating systems must be returned to the supplier as promptly as practicable, unless the cylinders are owned by the person buying the F-12 gas. In general, this should be done in less than 30 days from the date a cylinder is received.

S S S

Warns of Tire Scarcity

IN ANNOUNCING a fifty per cent cut in the number of heavy duty tires allocated to meet essential commercial motor vehicle requirements for the second quarter of 1945, Col. J. Monroe Johnson, director of ODT, warned operators that the number allocated may be subject to further reduction. He called attention to shortages of carbon black and other tire components recently announced by WPB which have resulted in temporary cessation of a program adopted to increase heavy duty tire production to meet military and essential civilian needs.

Reconversion Policy Announced

DEFEAT of Germany will bring a sharp decline in war production together with relaxation of production controls, according to War Mobilizer Byrnes in his second report to Congress. There will be an immediate release of 20 per cent of resources from munition production in the first quarter, and an additional five per cent will be released each quarter to a total of 40 per cent the first year, he said.

Production controls must be released as promptly as possible to encourage enterprise to reconvert with maximum dispatch, he said. Controls will be relaxed, first, through increased use of "spot" authorization and, second, through discontinuance of the Materials Control Plan and substitution of a simple priorities plan. He emphasized the necessity for continued price, wage and rationing controls after the war.

The report told of measures which have been taken to relieve manpower shortages and said some of the cumbersome procedures prevent the program from being effective promptly in placing workers where needed. Controls are necessary, it stated, not only for war production but also for the production of essential civilian goods.

He reviewed the basic machinery for reconversion, saying a sound policy of cutting war production is now in effect. He recalled that last February the War Department announced military procurement program had been cut by $12,800,000,000 and that in March the Navy Department took steps to stop the construction of 72 Navy vessels and 142 Merchant vessels not essential to production of the war with Japan.

Sale of war plants is desirable even before the plants have become surplus if they are to be converted to civilian production immediately, Byrnes said. He reported he has asked the Department of Justice to work with the Surplus Property Board and the RFC to develop procedure for such sales.

After the defeat of Japan, he anticipates a tremendous demand for materials for reconversion and to restore consumer goods in this country, and a huge demand from aboard where destroyed homes and factories must be rebuilt.

WPB Considers Allocation Order on Carbon Dioxide Gas

THE advisability of issuing an allocation order to control the distribution of carbon dioxide from June 1 to September 30, in face of an indicated shortage of 75,000 tons during this period, was recently discussed by the War Production Board with members of the Carbon Dioxide Industry Advisory Committee.

The committee recommended against allocation and took the position that the present form of control (whereby the distribution is governed by Direction 5 of Priorities Regulation 3) plus field instructions for processing applications is sufficient. The committee also said it would assume the responsibility for guaranteeing delivery against all military and essential requirements under the present control system. A minority of the committee favored a simple allocation order.

WPB officials told the committee that the agency probably will not reach a final decision on the matter for another 30 days, but stated that WPB believes allocation of the gas would be more effective in assuring military and essential requirements and at the same time would release greater quantities to less essential cousumers. WPB officials said this opinion is based on past experience with a great many different allocation order.

Evaporative Coolers Eligible for Price Increases

MANUFACTURERS of evaporative coolers are eligible for individual price increases if they fulfill the requirements under which such increases may be granted, the Office of Price Administration announced March 24.

In the same action, effective March 28, 1945, OPA made it clear that evaporative coolers are included under household air conditioning equipment and are covered by the general consumers durable goods regulation, Maximum Price Regulation No. 188.

Production of the coolers has been permitted in certain western states where they are needed by war workers because of the hot arid climate there. OPA said that a shortage of the coolers existed in these areas because none had been produced since August 1942. Today's action is expected to result in an increased supply through adjustment of the maximum prices manufacturers are permitted to charge, the agency said.

Condensing Units and Materials

THE General Refrigeration and Air Conditioning Industry Advisory Committee, in its March 14 meeting with the W.P.B. was informed that supplies of controlled materials available for production of refrigeration equipment during the second quarter will be about 15% below first quarter supplies. Frank Millham of the General Industrial Equipment Division revealed that manufacturers would probably have to divert some material from less essential civilian production to the more essential civilian and war requirements.

W.P.B. informed the committee that the condensing unit supply is being absorbed on AA-1 and AA-2 orders, some of which are scheduled for uses less essential than users who can only place orders on AA-3 rating to producers. It would appear that the use of M.R.O. ratings have been abused in some cases and in others the C.M.P. regulation may have been misused, which would account in some measure at least, for the large number of high rated orders.

The Refrigeration Section of W.P.B. informed the committee that the proposed order L-38-a had been dropped. The changes planned in order L-38, rather than issuing a new order are expected to solve the problem in connection with the distribution of condensing units.

Spot Authorization Production for Last Quarter

ACTUAL production of civilian type goods under the spot authorization procedure during the fourth quarter of 1944 was about 30 per cent of the total production authorized under the plan, the War Production Board reported March 28.

This finding is based on a survey made by the WPB Controller Division for the purpose of determining how effective the spot procedure is in bringing about the utilization in the manufacture of civilian goods of manpower, facilities and materials not needed for war production.

The report based on the survey concludes that the spot plan has been effective for authorizing unprogramed civilian production and that manpower has not been diverted from war work as a result of its operation.

Production of refrigerating and air conditioning equipment were covered by 93 authorizations amounting to $8,041,000.

Ceiling Price Adjustments for Electrical Controls

CEILING price adjustments that may be necessary for electrical controls, such as thermostats, when they are again produced in greater volume for civilians, were discussed at the first formal meeting of the Domestic and Commercial Electrical Control Manufacturers' Industry Advisory Committee with official of the Office of Price Administration, held recently in Washington, D. C.

A task committee from members of the group was formed to work with OPA in drawing up a cost questionnaire to be sent industry members to determine what, if any, ceiling price adjustments may be necessary. OPA told the committee that its pricing consideration will also involve a study of the industry's methods of distribution.

Because the industry's present production consists mainly of electrical controls used in Army tanks and airplanes, it is expected that the industry will be slow in getting back into peacetime production. However, a small part of present production is in thermostats for home and commercial furnaces.

Other products made by the industry, such as aquastats and pressure controls for furnaces, air-conditioners and refrigerators, will not be marketed in any volume until the war ends. These products at present are being sold as replacements when essential equipment breaks down.

Peacetime production of electrical controls is valued at $50,000,000 and $60,000,000. Present production of war goods is valued at between $100,000,000 and $125,000,000.

The committee elected these officers: chairman, W. L. Huff, vice-president, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.; vice-chairman, Malcolm E. Henning, vice-president, Penn Electric Switch Co., Goshen, Ind.; and secretary-treasurer, V. R. Tate, vice-president, Perfex Company, Milwaukee, Wis.

S S S

Records on Sales of Government Surplus Property

RETAILERS are required to keep their customary records, and all other resellers must keep specified records, on any sales they make of Government surplus property for which ceiling prices have been established in special orders, the Office of Price Administration announced April 2.

These requirements, effective April 5, 1945, are similar to record-keeping provisions in OPA price ceiling regulations. Heretofore, no record-keeping was required in many special orders setting ceilings on different items of Government surplus property sold for civilian use.

The record-keeping is required for compliance purposes. OPA pointed out that, when no records of sales and price are available for inspection, it is more difficult for OPA to check transactions for the purpose of determining if the ceiling has been exceeded.

The specific records required to be kept by resellers other than retailers are date of sale, name and address of buyer, description of commodity, quantity of sale, and price charged.

On resales of Government surplus property for which ceilings are not established by special orders, the existing regulations providing the applicable ceiling prices contain their own record-keeping provisions.

Among other changes in the general supplementary order establishing ceilings on sales by Government agencies and certain resales is one requiring that sales by the Government of second-hand electric motors of ¾ hp. or less will be subject to price control. These small motors, which have been in increasingly critical demand for operating household refrigerators, washing and ironing machines, etc., had been exempt from price ceilings. Occasional sales of them are expected to be made by the Government, and price control is required to prevent exorbitant prices being bid for them, OPA said. The motors will be subject to a ceiling of 75 per cent of the cost of the same or equivalent motor when new.

S S S

Goods May Return to Civilian Markets

NEARLY all types of civilian goods, including refrigerators, may return to the civilian market within a year after the defeat of Germany, J. A. Krug, chairman of the War Production Board said April 3. The production rate, Mr. Krug said, is expected to approximate that of 1939 within twelve months after V-E Day on practically everything civilians need, although there will be some exceptions. His belief that civilian production can be undertaken soon after the defeat of Germany was based on the supposition that munitions production can be cut back 12 per cent within the first quarter and 35 per cent within a year.

The Dehydration of Refrigeration Parts with Air

By R. L. Hendrickson
Associate Editor, Refrigeration Service Engineer

THE dehydration of parts of a refrigeration system too large to place in a bake oven need not be a difficult procedure if the shop operator understands the properties of air and water vapor mixtures. In this article we will first discuss the properties of air, then apply the knowledge gained to practical use.

The many common troubles resulting from improper or inadequate dehydration of the component parts of a refrigeration system has prompted the author to present the information contained herein as a possible solution to dehydration problems.

Properties of Air

The main thing with which we are concerned is the ability of air to hold water vapor as a mixture of dry air and water vapor. Here we must stop and consider a fundamental law expounded by the English chemist and physicist, John Dalton, in the early nineteenth century. Dalton's law of partial pressures states that: "When a liquid is in contact with a gas that has no chemical action upon it, the amount that will evaporate and the pressure of the saturated vapor will be the same as though the other gas were not present." The "gas" for our purpose may be air, carbon dioxide, or nitrogen—all of which are inert gases.

It makes very little difference so long as the gas is permitted to act as a carrier for the water vapor in order to prevent a saturated vapor condition. "Saturated vapor" is the result of evaporation to a point where no more liquid will evaporate at the given pressure and temperature. If the temperature is increased or the pressure is diminished, additional evaporation will take place because greater quantities of vapor are required for saturation under either or both of these conditions.

Weight of Vapor Per Pound of Air

Dry air has a very high affinity for water vapor. It acts somewhat similar to a sponge in holding water. If we refer to tables on the properties of air and water vapor, we note the rapid increase in quantity of water vapor to saturate the air as the temperature rises. For example, air at —25°F. and at atmospheric pressure is saturated with water vapor when it contains .0001968 pounds per pound of air while the same one pound of air at the same pressure will hold 2.261 pounds of water vapor at 200°F. We can roughly approximate the relative humidity of the above sample of air when heated from —25°F. to 200°F. by taking the ratio of the pounds of water contained as compared to the actual amount

TABLE I. PROPERTIES OF MOIST AIR

Temp. °F.	SATURATION Humidity Ratio lbs. of water per lb. of Dry Air		VOLUME Cu. ft. per lb. of Dry Air	
	Pounds	Grains	Dry Air	Saturated Mixture
0	.000785	5.50	11.58	11.59
5	.001017	7.12	11.70	11.72
10	.001311	9.18	11.83	11.85
20	.002144	15.01	12.08	12.12
30	.003439	24.07	12.33	12.40
40	.005194	36.36	12.59	12.69
50	.007626	53.38	12.84	12.99
60	.01103	77.21	13.09	13.32
70	.01574	110.2	13.34	13.68
80	.02221	155.5	13.59	14.08
90	.03102	217.1	13.84	14.53
100	.04293	300.5	14.10	15.07
120	.08093	566.5	14.60	16.50
140	.1521	1064.7	15.10	18.79
160	.2961	2072.7	15.21	23.03
180	.6501	4550.7	16.11	32.94
200	2.261	15827.0	16.61	76.99

the sample would hold at the higher temperature. In this case

$$\frac{100 \times .0001968}{2.261} = .0088\% \text{ or } 88/10{,}000 \text{ of } 1\%$$

We also can determine just how much water vapor can be absorbed if a quantity of air is increased in temperature. It is only necessary to increase the temperature of the air above normal room temperature to increase its ability for holding water vapor as shown in Table 1.

Air at 70°F. and 50% relative humidity (R.H.) will have an R.H. of approximately 19% when heated to 120°F. If heated to 220°F., the R.H. is reduced to 7/10%.

Air Drying Methods

Application of the above principles to drying refrigeration apparatus can be accomplished in several different ways. For example, air can be taken in to an air compressor through a large dryer and then compressed into a storage tank ready for use, or the air may be compressed and then heated to a higher temperature as it enters the part to be dried, or the air may be passed through a cooling process, which will freeze the moisture out, and then into a storage tank ready for use.

The point to remember is that the air has much better drying qualities when hot because it promotes evaporation of the water. It will generally be found that water present in refrigerant lines or evaporator tubes is "sealed" under an oil film which tends to prevent evaporation. The viscosity of the oil will decrease with an increased temperature and as a result the oil film tension will be less at a higher temperature. Heating the part to be dried either by hot air or external heat will permit the small drops of water to more readily break through the oil film and be picked up by the drying qualities of the air.

Fig. 1 shows a simple method of dehydrating the air, heating it, and then passing it through the part to be dried. Air passes through the dryer into a tank heated by a gas burner, then from the tank outlet to the coil and is discharged through a vacuum pump. This system will permit drawing a vacuum on the coil by closing valve A and allowing the vacuum pump to run. More hot air can be introduced from time to time to keep the coil warm.

The gas burner should be controlled by a thermostat and solenoid to prevent overheating of the tank. A by-pass line is installed around the solenoid to keep the burner at a minimum flame while the equipment is in operation.

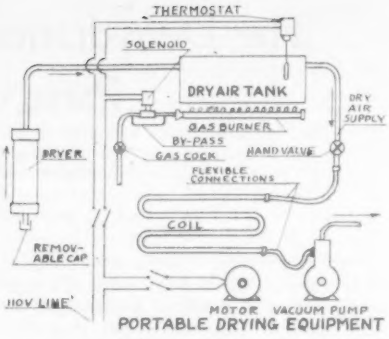


Fig. 1. Dehydrating System Using Vacuum Method.

The entire assembly can be arranged for transporting it to the job if desired. Connection for gas can be an approved flexible hose. Flexible charging lines or tubing can be used for hooking up to the part to be dehydrated.

Selecting the Dryer

The dryer should be of sufficient capacity to permit operation for many hours without recharging. This type of dryer can be filled with anhydrous calcium chloride. It is recommended that the dryer be mounted in a vertical position with the inlet at the bottom to prevent calcium chloride solution from being drawn into the dry air

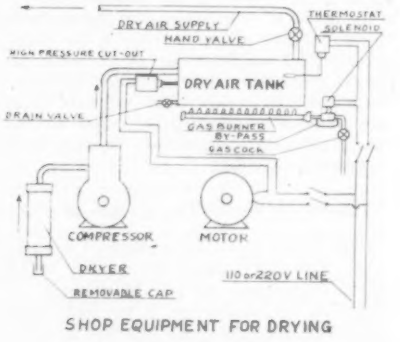


Fig. 2. Dehydrating System Using Compressed Air.

tank. The dryer should be made so that the ends are readily removed for inspection of the drying agent. The ends need not be air tight as in the case of a refrigerant dryer. Suitable caps should be provided for the dryer inlet and the outlet valve from the dry air tank should be closed when the equipment is not being used.

If it is desired to have dry air under pressure, the equipment should be hooked up in the manner shown in Fig. 2. Here, the air is taken from the dryer into an air compressor and discharged into the dry-air tank. This type of equipment requires additional parts and materials for building. A high pressure cutout is required to stop the motor when the air in the tank has reached the desired pressure. A safety relief valve must be installed on the tank. A drain should be provided on the bottom of the tank to remove oil or possible water accumulation.

Selecting the Dry Air Tank

In the case of the pull-through type shown in Fig. 1, an old water heater tank of questionable strength or even a white lead paint pail with the cover sealed on can be used. However, the pressure type must have a tank that has been pressure tested to twice the desired operating pressure. Due to the pressure rise of air when heated the high pressure cut-out should be set lower than the operating pressure carried in the tank. The safety valve should be set to open at a pressure about 10% higher than operating pressure. Remember, the operating pressure in this discussion is the pressure actually imposed on the tank when heated and is not the cut-out setting of the control.

The behavior of air when heated follows Charlie's law which states: "The volume remaining constant, any change in temperature will show a direct proportional change in pressure. Stated as a formula, the law becomes:

$$P_1 = \frac{P \times T_1}{T}$$

where: P = the original absolute press.
P_1 = the new absolute press.
T = the original absolute temp.
T_1 = the new absolute temp.

For example, a pressure of 150 Psi.A. (pound per sq. in., absolute) at 70°F. (529.7°F., Abs.) will increase to 192.47 Psi.A. when heated to 220°F. (679.7°F., Abs.). A cut-out gauge pressure of 125 lbs. will be ample for all purposes.

A suitable thermostat for controlling the gas solenoid can be made from any defective control that has a bulb as the sensitive element. The bulb must be charged with water to withstand the pressure and permit operation at the high temperature. Water at 220°F. has a boiling pressure of 2.5 Psi. The bulb can be filled by submerging the power element in boiling water; then allow the water to cool before removing the bulb for sealing. Here we again make use of Dalton's law because the entire charge of vapor in the power element need not be removed as the steam pressure will combine with the residual vapor in the bellows to actuate the control. The bellows should be mounted so it will freely drain the condensed water back to the bulb.

S S S

REFRIGERATION SERVICE SCHOOL COMPLETES FIRST YEAR

A SUCCESSFUL program of training in refrigeration service has been completed at Syracuse, N. Y. A year ago Bernard O. Larsen, principal of the Syracuse Apprentice Training School called a meeting of representatives of the refrigeration service industry in this area. It was found that 20 men were left out of 70 formerly engaged in the work.

A course was organized under the direction of Donald M. Kidd, director of vocational education. Twelve men were enrolled in the first class. Sessions were held five days a week, eight hours a day for five weeks. A local refrigeration serviceman taught the students and equipment was donated by companies engaged in that work. During 1944, 119 men were registered and 118 of them completed the course and received certificates. Sixty-nine of them have been employed either by commercial refrigeration plants or by domestic service companies; 33 more trainees have started service businesses of their own—five in Syracuse and 28 in near-by communities.

S S S

A CHANGE from partnership to corporation has been effected by Albert N. Schwartz and Elmer George in their electrical refrigeration business at 2333 Reading Road, Cincinnati, Ohio. It will expand its activities after the war and become a service firm for several refrigerator concerns.

So You Want to Get into Business for Yourself

By Paul Reed*

IF YOU expect to become a refrigeration dealer, you will find that you need a good deal of money for a number of things that were of minor importance to an independent service operator, even one who employed several men. You must have capital to cover buying floor samples, and stock if possible, so that you can make immediate delivery. Sales are sometimes lost if the customer is asked to wait until you get the refrigerator from the distributor or manufacturer.

Finance companies (a type of banking institution that specializes in time-payment loans) have what is known as a "floor plan" under which they will lend part of the money with which to buy the floor samples, but you must furnish some of it. A dealer must invest capital in a nice-appearing store and display room and he must tie up capital in trade-ins, advertising, commissions, and advances to salesmen, but the largest capital investment will be his "accounts receivable," the unpaid bills from his customers and the "hold-back," if any, from the finance company.

Before the war, nearly all refrigerators and most of the commercial and air-conditioning equipment were sold on a time payment basis; that is, the customer paid a small down payment and the balance of the purchase price in equal monthly payments divided over a period all the way from 6 months to 3 years.

The following is a typical time payment transaction before the war. A dealer had a 6 cu. ft. refrigerator, the factory list price of which was $200.00. This was the cash price, but if the customer wished to pay for it by monthly payments, he had his choice of several plans, all the way from a large down payment and comparatively large monthly payments over a period of a year to a small down payment and small monthly payments for 30 months. He chose the 18 month basis which made the down payment $20.00 (10% of the cash price) which left a balance of $180.00 to be paid over a period of 18 months. The interest and fees for the $180.00 for the 18 months was $19.80 which made the unpaid balance $199.80 and this divided by 18 made the monthly payments $11.10.

So the customer gave the dealer $20.00 and signed a "conditional sale" contract which provided that the refrigerator remained the property of the dealer until all 18 payments were made and that the dealer could repossess the refrigerator at any time if

ARTICLE VI.—The problems and details of financing a refrigeration sales and service business—Time payment transactions—The cost of Capital—The importance of turnover.

the customer failed to keep up his payments and the money that the customer had paid on the refrigerator would be retained by the dealer as rental for use of the refrigerator. Most of these time payment contracts made on a "conditional sale" basis provide that if the dealer repossesses the merchandise, he cannot also hold the customer for any further payment.

If the dealer had held the contract himself, he would still have had $199.80 coming to him which was his $180.00 plus the $19.80 that the finance company would have charged as interest at 8% plus fees. But for most dealers, this would be prohibitive for they have to get their money out of the merchandise so as to buy more merchandise and pay running expenses. So this dealer

* Chairman of the Wartime Educational Committee R.S.E.S. and Manager Refrigeration Division, Perfex Corporation.

would take the contract to the finance company with whom he "financed his paper" and they would give him all or part of the $180.00 and keep the $19.80 as their interest. The finance company gets most of their capital from individuals or banks at a rate of interest much lower than 8% and the difference must cover their expenses and their profit.

The Finance Credit Risk

If this dealer has a good reputation and can show a good "financial statement" that he has a substantial net worth, the finance company will probably give him the full $180.00 at once, or they may "hold back" as much as 20% of the $180.00 if the dealers credit rating is very low. If the dealer has to finance with a "hold-back", even as much as 10%, he is going to have quite a tough time of it for the first couple of years until the hold-back has built up a substantial credit for him at the finance company.

As a part of the agreement between the finance company and the dealer, the dealer is to guarantee payment of the account; that is, if the customer fails to make his payments the finance company turns the contract back to the dealer for the balance unpaid at that time. The dealer can then either repossess the refrigerator and resell it or he may worry along and try to get his money out of the customer.

Contracts with Recourse

If a dealer agrees to "make good" to the finance company in this manner, the contracts are said to be financed "with recourse." Obviously, the purpose of the hold back is to cover the finance company's cost of repossessing and reselling the refrigerator if the customer defaults his payments and the dealer fails to keep his promise. Of course, if he didn't, he probably would be unable to finance any more contracts at that finance company, but he might die, sell out or simply quit business, and his heirs or successors might not take over his liabilities.

The rate of interest charged by finance companies is very high compared to the ordinary rate of commercial bank interest. The reason is that the cost of operation of the finance company is high. Their collection costs are high, also the transactions are small—it is a "retail" loan business. At the present time, there is a war-time law that prohibits down-payments of less than 33 1/3% of the purchase price and time-payment contracts of more than 15 months, but this will probably be rescinded after the war when the time comes that buying is to be encouraged again.

Capital Investments

Capital, as mentioned previously is due its wages. If you invest $1,000 in stocks or bonds you get, say $50.00 (5%) per year. If you invest that $1,000 in your business or if you borrow it from a bank, the $50.00 must be charged in as a part of your operating cost. Moreover, if you spend this $1,000 for furniture, store fixtures, tools, benches, lathe, drill presses, trucks or other equipment for store, office or shop, that will wear out or become obsolete and therefore be of little or no value in time, you should include their cost as a part of your expense of doing business. The $1,000 so invested disappears after a time and must be "written off."

How Depreciation Is Figured

The length of time over which the $1,000 must be distributed depends upon what it was spent for. If it was spent for a lathe, it can be spread over several years, to be safe, 5 years. So $200, or 1/5 of the $1,000 should be charged into the cost of doing business for each year for 5 years so as to get the $1,000 back. This process is sometimes known as "amortizing" the equipment. If the $1,000 was spent for a truck that is expected to be used for two years and can be traded in for $400, the $600 should be written off at the rate of $300 per year and charged into the overhead at that rate. It is unsafe in a small retail business to amortize the capital invested in equipment, over a period of more than five years, hence the statement in a previous article that a business should pay for itself within at least five years.

Working Capital

In addition to the capital invested in equipment that must be amortized, there is also "working capital" which is the amount of money you must have in the business to meet current expenses and to pay for stock and to supply the money tied up in "accounts receivable" (outstanding unpaid invoices due the dealer from customers). This

capital does not have to be amortized, for it is "liquid," it can be turned into money quickly and is not "frozen" as is capital invested in equipment.

It is the capital that is most affected by "turn-over". If you have a working capital of $2,000 and a capital of $1,000 frozen in equipment you have a total investment of $3,000. The working capital will, we will say, let you pay current expenses and keep $1,500 invested in stock and display. If you can "turn-over" your stock every 90 days you can do an annual volume of only $6,000 cost or about $10,000 selling price. If you make a 10% *net* profit on sales volume, you make a *net* profit of $1,000 per year.

Turn-Over Can Build Profits

If you watch your turn-over and push your sales effort and sell $15,000 worth of merchandise a year (cost of about $9,000) with the same amount of working capital ($1,500) you have turned your stock over every 60 days instead of every 90 days. So, assuming that you still are able to make a net profit of 10% on sales volume, you have increased your net profit from $1,000 to $1,500 per year, by increasing your volume and on the same capital—both fixed investment and working capital.

Let us suppose that it would cost a small dealer about $350 per month or $4,200 a year for rent, office girl, lights, heat, phone, freight, miscellaneous supplies, interest on capital and amortization of equipment. This would be his "fixed overhead" plus operating expenses. He has been working for someone else and averaging $5000 per year, so he charges this in also, making a total expense of $9,200. If he makes a *gross* profit of $9,200 he is no better off than if he had continued working for someone else. Probably worse off, for he will have more worry and more headaches. So, to make it worth while, he should make a net profit of at least 10%.

Volume to Show Profit

He gets, on an average, a discount of 35% from the manufacturer list price. If he makes a 10% net profit then there will only be 25% to cover *all* expenses including his own salary (but not net profit). So he will have to do a business of $37,800 per year ($9,200÷25%) in order to make his salary, clear expenses and make a net profit of 10%. All this presumes that the finance company doesn't deduct a hold-back. If they do, it will eat up the net profit for the first year or two until he gets enough credit reserve at the finance company that the hold-back will not affect him, except that, if he increases his volume of business the finance company may ask for a hold-back on the additional business, for obviously there would be increased liability and increased possibility of repossessions. If, however, he has kept a good standing with the finance company and if they have had favorable experience with his customers, they will be inclined to waive further increase of the credit reserve.

All this time he has been doing all the selling himself. Before the two years had passed, he would probably have put on a salesman or two so as to increase his volume and make more money. But he may have had to borrow money to meet the extra operating expenses for he would have had commissions to pay, additional advertising, freight and perhaps hold-back. From all this, it will be seen that the retail refrigeration dealer isn't doing too badly if he makes enough to live well on for the first year or two.

Service Department May Add to Income

He can supplement his income by operating a service department, which can take care of his own service and make enough on outside paid service to give him some net profit. His fixed overhead is increased very little,—rent, phone, office girl, etc. all the same; some increased truck supplies but most of the added cost is the serviceman's labor and the parts and materials both of which the customer pays for with some profit to the dealer. Even only one good service engineer and a helper should net him a profit of an extra $1,000 per year.

(To be continued in next issue)

HEAT PUMP IDEA 93 YEARS OLD

THE fact that refrigerating systems are reversible has been known for 93 years, but steps toward applying this principle to home heating were taken only 20 years ago. The system, known as the heat pump, uses electric power to draw heat from the outdoor air. It is predicted that many homes in temperate zones will be equipped with the pump within ten years after the war.

Construction, Operation and Servicing (*Article Five*)

The Coldspot Electric Refrigerator

This is the fifth of a series of articles giving detailed servicing instructions on Coldspot Electric Units, compiled from the Service Manual issued by Sears Roebuck & Company, makers of the Coldspot Unit and is published with their permission. This is the first authorized publication of this material and will prove of inestimable value to the thousands of service engineers all over the country who daily come in contact with these refrigerators.

Checking the Overload Relay

The most satisfactory test for a defective relay is made by substituting one which is known to be good. For a quick replacement test, it is not necessary to make all the connections in the circuit (Fig. 26). A test relay can be connected directly to the compressor motor terminals as in Fig. (30). If the compressor motor runs normally on the test relay, the fan motor and other connections can then be made to test the other elements of the circuit.

If the overload in the test relay still cuts out with only the compressor motor in the circuit, it would indicate that the compressor is operating under an excessive load.

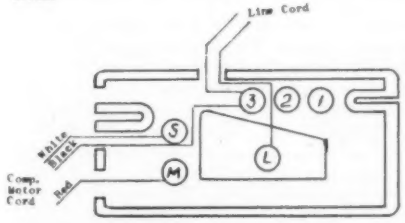


Fig. 30. Test relay connections.

Hermetic Fan Motor

The motor which drives the condenser-cooling fan on the hermetic units is a two-phase induction motor connected as described under Hermetic Unit (Fig. 26). Due to the method of connection the fan motor starts at the same instant as the compressor motor.

The series and shunt windings of the motor are in the circuit at all times when the overload relay is closed. Consideration of the wiring diagram will show that *if the series winding is open the compressor motor will not run* but the fan will run on the shunt winding alone. If the shunt winding is open the fan motor will not run or will lack power, but the compressor motor will operate.

The fan motor is replaceable if defective. It is mounted in rubber in a metal frame which can be unscrewed from the unit deck and removed as an assembly, Fig 31.

The motor proper can be removed from the mounting bracket by spreading the legs of the U-shaped mounting until the rubber grommets are clear of the motor lugs to allow the motor to be released.

When inserting the fan motor in the mounting bracket be careful not to distort the bracket as the motor must be supported without undue strain by the rubber grommets and lugs. Excessive vibration and noise can be caused by an uneven mounting.

The fan blades must be aligned properly to avoid vibration. Each blade must have the correct pitch and the blade tips must follow exactly in line when turning. *Do not attempt to change the fan air delivery by bending the blades.* The air velocity through the condenser must remain as originally designed for efficient operation with minimum sound.

READ THESE INSTRUCTIONS CAREFULLY BEFORE CONNECTING NEW FAN MOTOR, RELAY OR THERMOSTAT

Instructions for Wiring Hermetic Units

These instructions are furnished as a guide for connecting the various types of fan motors and relays that are used interchangeably on Coldspot units.

Fig. 31. Condenser fan motor mounting.

There are three types of units: Top mounted (unit in top of cabinet), bottom mounted (unit in bottom of cabinet) and Model 20000 (special top mounted unit used as a loaner or emergency replacement).

There are two types of fan motors: Three wire and two wire.

There are two types of relays. General Electric (G. E.) and Delco.

In all, there are twelve possible combinations each of which requires a different hook-up.

The charts below cover all of these possibilities. Find the combination that includes the unit, fan motor and relay that are to be connected in your Coldspot and connect as indicated.

Wires are identified by the color of the rubber insulation. In the charts: "R" means red, "W" means white and "B" means black.

Example: If you have a top mounted unit, a two wire fan and a G. E. relay refer to the top chart on the right and use the terminals on left side. Connect the compressor white (W) wire to terminal number 1 on the relay. Connect the compressor red (R) wire to terminal number 8. Connect the

TOP MOUNTED UNITS

Three Wire Fan Motor

G.E. Relay Terminals 1	2	3	4	5	6		Delco Relay Terminals S	1	M	L	3	2
W		R		B		Compressor wires	W		R		B	
	W	R		B		Fan motor wires		W	R		B	
			W		B	Power cord wires				W		B
	W				B	Thermostat wires		W				B
			W		B	Cabinet lamp wires				W		B

Two Wire Fan Motor

G.E. Relay Terminals 1	2	3	4	5	6		Delco Relay Terminals S	1	M	L	3	2
W		R		B		Compressor wires	W		R		B	
	B		W			Fan motor wires		B		W		
		W		B		Power cord wires				W		B
			W	B		Thermostat wires					W	B
		W		B		Cabinet lamp wires				W		B

Model 20000 With Three Wire Fan Motor

G.E. Relay Terminals 1	2	3	4	5	6			Delco Relay Terminals S	1	M	L	3	2
W		R		B		Solderless Connector	Compressor wires	W		R		B	
	W	R		B			Fan motor wires		W	R		B	
			W		B		Power cord wires				W		B
	W				B		Thermostat wires		W				B
					B	W	Solderless Connector	Cabinet lamp wires	W					B
		B				W		Unit lamp wires	W			B		

Model 20000 With Two Wire Fan Motor

G.E. Relay Terminals 1	2	3	4	5	6			Delco Relay Terminals S	1	M	L	3	2
W	B	R				Solderless Connector	Compressor wires	W	B	R			
	W	B					Fan motor wires		W	B			
			W		B		Power cord wires				W		B
	W				B		Thermostat wires		W				B
					B	W	Solderless Connector	Cabinet lamp wires	W					B
		B				W		Unit lamp wires	W			B		

BOTTOM MOUNTED UNITS

Three Wire Fan Motor

G.E. Relay Terminals 1	2	3	4	5	6		Delco Relay Terminals S	1	M	L	3	2
W		R		B		Compressor wires	W		R		B	
	W	R		B		Fan motor wires		W	R		B	
			W		B	Power cord wires				W		B
	W		R		B	Thermostat wires		W		R		B
Connect to red and black thermostat wires						Cabinet lamp wires	Connect to red and black thermostat wires						

Two Wire Fan Motor

G.E. Relay Terminals 1	2	3	4	5	6		Delco Relay Terminals S	1	M	L	3	2
W		R		B		Compressor wires	W		R		B	
	B		W			Fan motor wires		B		W		
		W		B		Power cord wires				W		B
		R	W	B		Thermostat wires				R	W	B
Connect to red and black thermostat wires						Cabinet lamp wires	Connect to red and black thermostat wires					

compressor black (B) wire to terminal number 5 on the relay.

Proceed in like manner with the wires from the other parts of the unit, connecting the indicated color of wire from each of the other components to the proper relay terminal.

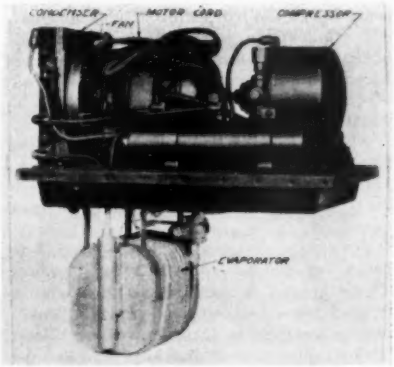


Fig. 32. Back of unit showing receiver.

As a final check in this example: There should be one white wire connected to terminal number 1, no wires on terminal number 2, one red and one black on number 3, two white wires on number 4, one black and two white wires on number 5 and three black wires on number 6.

Condensers and Receivers

The condenser is made of finned copper tubing, fitted with a fan housing to produce flow of air through the condenser. The air speed is approximately 350 ft. per minute.

It is imperative that air passages be clean and unobstructed. A condenser can be best inspected by holding a bright light (flashlight) at one side and looking through the condenser from the other side. Dust can be loosened by brushing the fins with a stiff brush. A hand air pump will remove the loosened dust.

On very early models, the receiver was a horizontal tank mounted back of the motor, Fig. 32. Later the receiver was formed of a steel tube bent in the form of a "U". This receiver also served as the mounting frame for the motor and compressor.

Receivers used with rigid mounted and hermetic units were either cylindrical or spherical (See Fig. 33). These two types of receivers are fitted with a purging valve at the top for the purpose of purging air which may be drawn into the system.

REFRIGERANT CONTROL VALVES

All Coldspot units manufactured before 1940 are of the "dry expansion" type and use an *automatic expansion valve* as the refrigerant control valve.

Some models manufactured in 1940 and after are of the "flooded" evaporator type and use a *float valve* as the refrigerant control valve.

Expansion Valve Adjustment

The proper adjustment of the expansion valve is essential to satisfactory operation of the unit. It is the only control of the *capacity* and *temperature* of refrigeration except the thermostat.

Because the evaporator temperature is determined by the vacuum that is maintained and the vacuum is determined by the expansion valve adjustment, it is obvious that the expansion valve setting can be found by using a thermometer to measure the evaporator temperature.

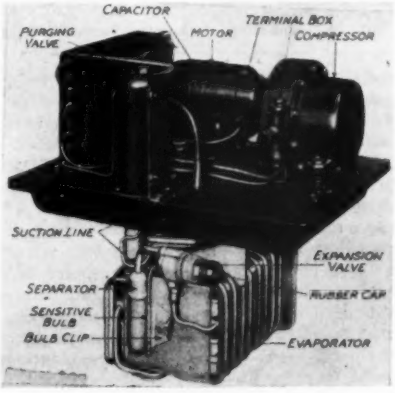


Fig. 33. Cylindrical type receiver.

A gauge can be used to measure the vacuum in inches but the accuracy of a gauge can vary due to mechanical defects, distortion or fatigue while a glass thermometer retains its original accuracy unless broken or the column separated. The faults of a defective thermometer are obvious on inspection while a gauge, unless checked by a master gauge or mercury column, can be

inaccurate without exhibiting visual symptoms. However, even an accurate thermometer cannot be relied on unless the evaporator is frosted over and the cabinet is chilled.

Thermometer Method

Remove the ice cube trays and melt the frost off of the inside bottom of the evaporator in order that the bulb of a thermometer may contact with the metal of the evaporator directly above the second coil from the front. Place the thermometer as shown in Fig. 34 with the bulb in contact with the

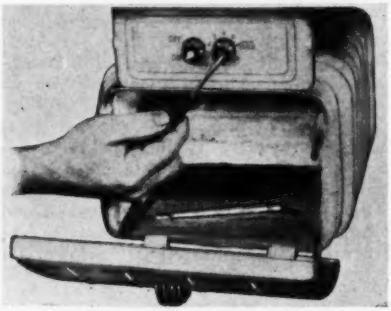


Fig. 34. Checking evaporator temperature.

shelf. Support the other end of the thermometer with a pencil or watch. Drop a few drops of water on the bulb to freeze it solidly to the shelf. THE THERMOMETER BULB MUST TOUCH THE METAL OF THE SHELF. Short out the thermostat to obtain constant running of the motor. Allow the unit to operate long enough to frost the entire evaporator. After about 6 minutes, read the thermometer and take additional readings at 2-minute intervals until temperature has become constant, that is, the reading has not changed since the previous reading. *Closing the expansion valve* (turning the screw counter-clockwise) *lowers the temperature.* Opening the expansion valve (turning clockwise) *raises the evaporator temperature.* Do not turn the adjusting handle more than an eighth of a turn at one time as the valve is extremely sensitive. Turning the adjustment one half turn will change the evaporator temperature as much as 4° F. The constant running temperatures for various model units are given in the latter part of this series.

(To be continued in next issue)

U. S. PATENTS OF ENEMY ALIENS OFFERED FOR LICENSE

AN EXCEPTIONAL opportunity for United States citizens to reap the profit from millions of dollars of enemy research is presented through the Office of Alien Property Custodian. At the outbreak of the war, some 45,000 United States patents and patent applications were seized from enemy aliens and nationals of occupied countries. Licenses under most of these are now available to United States citizens for an administrative fee of $15.00 per patent.

About 30,000 of the seized patents are of German origin. Many of the remaining are Italian and Japanese. They cover practically every field of mechanics, electricity, and chemistry.

For ease in examination, the 45,000 patents have been divided into 312 general groups. These groups include aeronautics, amusement devices, bleaching and dyeing, brakes, carbon compounds, formentation, fertilizers, photography, circuit breakers and conductors, foods and beverages, internal combustion engines, machine elements as well as metal binding, drawing, forging, founding, rolling, working, and treatment.

These groups cover also metallurgy, mining and harvesting, optics, plastics, power plants, refrigeration, ships, telephony and telegraphy, textiles, valves, vegetable and meat cutters together with woodworking.

Patents Summarized

To help business men still further the chemical patents and patent applications have been summarized and digested. The complete set of 8,000 chemical abstracts appropriately indexed is available for $25 through the Office of Alien Property Custodian, Chicago 3, Ill.

In the same manner short descriptions and drawings of the 37,000 mechanical and electrical patents are being prepared. The first two of five volumes are ready now. The remaining three will be ready shortly. These too, will be available for $25.00 per set through the Office of Alien Property Custodian, Chicago 3, Ill.

Copies of the actual patents themselves may be seen at the Office of Alien Property Custodian, Field Building, Chicago; 120 Broadway, New York City; 17 Court St., Boston, Mass.; National Press Building, Washington, D. C.; and Guardian Building, Portland, Oreg.

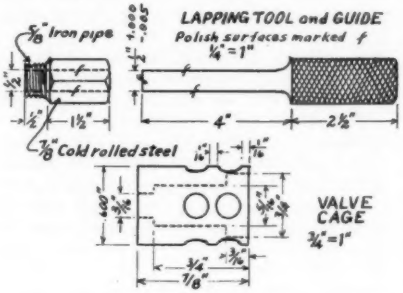
SERVICE POINTERS

Practical Solutions of Your Service Problems

EDITOR'S NOTE: Here are additional contributions submitted in the Service Pointers Contest. Others will appear in the next and following issues.

COLDSPOT VALVE LAPPING AND CAGE REPLACEMENT

MANY of the service calls I have made on Coldspot units have been traced directly to the check valve seat being chipped or the valve cage being worn. In order to lap the valve seat, a special tool must be made as shown in the accompanying drawing. The entire tool can be made by a lathe if close machining is maintained. When the lapping face is worn, it should be refaced on a lathe to assure a perfect surface at right angle to the guide.



When the check valve seat is found to be defective, the check valve cage will often have one leg worn down so that the disc does not drop flat onto the seat. A new cage can be made of 5/8 inch cold rolled steel as shown by the accompanying drawing. Grip the piece in a universal chuck and finish to .600 outside diameter 1 inch long. Drill to a depth of 1 inch with a 3/16 inch drill. Then drill to a depth of 3/4 inch with a 5/16 inch drill. Next, cut a 1/2 inch hole to a depth of 3/16 inch or drill with a 1/2 inch bottoming drill. Cut the piece off slightly longer than 7/8 inch and reverse in chuck, then machine the end to 7/8 inch over all length. Drill 2 holes every 90 degrees instead of cutting slots in the sides as on the original piece. *Submittted by G. E. Van Hyfte, Taunton, Mass.*

DEHYDRATING METHOD

AFTER trying several methods of removing moisture from low sides, we have one that should be of interest to every service man having the stubborn moisture troubles found in some ice cream cabinets, quick-freeze cabinets or beverage coolers.

It is usually impossible to pull the coil out of the average ice cream cabinet due to the manner in which the insulation is sealed in.

By placing a large light bulb (about 150 watts) connected to an extension cord inside the cabinet and replacing the lids or tops, enough heat will be given off to furnish the same effect as an oven. While this heating process is taking place, a vacuum pump should be connected to the coil and a vacuum maintained for several hours. Do not leave this arrangement over night or there may be enough heat accumulated to cause the rubber lids and sealing compound to melt.

This same method may be used on domestic refrigerators where removal of the evaporator is not practical or in shops which do not have an oven. *Submitted by R. L. McDougal, Memphis, Tenn.*

CONVERTING STEWART-WARNER TO METHYL CHLORIDE

WE HAVE had excellent results in performance and smooth operation by converting Stewart-Warner SO_2 machines to methyl chloride in the following way.

Remove the pistons by unscrewing the shaft from the eccentric (turn in counter direction to rotation) then take the pistons out. Saw off the top of the piston farthest from the wrist pin. Solder discharge port for this piston. Reinstall using a new seal and put in proper grade of methyl chloride oil.

Install dryer in the liquid line and charge system with methyl chloride. Set the automatic expansion valve to open at four to six pounds pressure. Machines altered in this way apparently require less power and freeze faster than the original. *Submitted by Joe Hartinger, Green Bay, Wis.*

A METHOD OF RECONDITIONING THE INNER COMMUTATOR FACE

AT times it is necessary to refinish the inner face of a commutator, preliminary to renewing the short circuiting device, without the aid of a lathe or other refined shop equipment. The following method may be used on small Delco and Wagner motors, requires a minimum of tools and has proven entirely satisfactory:

The refinishing tool is an ordinary one-inch pipe coupling turned down to approximately 1/32 inch less in diameter than the commutator for a distance of approximately one inch from the end. Number 200 Oxide cloth is then wrapped around the coupling to fit snugly in the commutator. A tight fit may loosen the commutator bars.

The armature, with the coupling inserted in the commutator, is rolled forward on a table or work bench while the coupling is held by hand to prevent turning. It is then rolled backward allowing it to turn with the armature, after which the forward operation is repeated. This process is continued until the commutator assumes a polished condition.

The tool may be turned with a slight taper thus providing a means of adjusting the fit between the tool and the commutator during the polishing operation without replacing the polishing cloth. It is not necessary that the coupling be turned down on a lathe as it is approximately the correct size as purchased. It may be filed, sanded or ground to the desired size.—*Submitted by Charles Gilbert, Ft. Worth, Texas.*

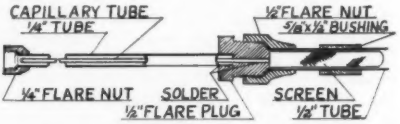
CAPILLARY TUBE FOR M-W HIGH SIDE FLOAT

WHEN the high side float on a Montgomery Ward unit fails, it can be replaced by a Crosley type capillary tube. The float is removed by cutting the tubing where it enters the float, then solder a 3/8" x 1/4" reducer on the condenser outlet. Solder a short piece of 1/4" tubing into the reducer and solder the capillary tube into the tubing. Use .114 O.D. by .050 I.D. capillary tube 8 feet long for Freon-12 systems and Harry Alter Co. No. 22306 for sulphur dioxide systems. Next, remove the intermediate valve at the evaporator and solder the capillary tube into this evaporator connection. *Submitted by Jack B. Walden, Ft. Worth, Texas.*

REPAIRING OR REMODELING CARRENE METERS

THERE are three general types of carrene meters used on Grunow units; the high side float tank, the small meter that can be opened and the larger meter that is brazed shut.

The high side float seat can be unsoldered just below the tank. The float needle and seat can be inspected and cleaned. The tank can also be washed out and if everything looks good, solder the meter together again and use an external dryer. But if there is any doubt, it should be converted into a capillary tube type meter.



The material needed consists of one each of the following: replacement capillary tube and strainer, a short piece of 1/2-inch tubing with flare, 1/2-inch flare nut, 1/2-inch flare plug, 1/4-inch tubing same length as the capillary tube, 1/4 inch flare nut and a 5/8 to 1/2-inch bushing. Drill a 1/4-inch hole in the 1/2-inch flare plug and assemble, as per sketch:

Drive the float up into the top of the tank with a punch and put about one-half pound of silica-jel into the tank. Insert the 1/2-inch pipe and bushing into the hole in the bottom of the tank and solder in place, turn the tank right side up and bend the 1/4-inch tube to clear the base. Connect the 1/4-flare nut to the evaporator inlet and test all connections for leaks.—*Submitted by C. L. Carter, Pueblo, Colorado.*

OIL LOGGING STOPPED IN LOW-SIDE FLOAT EVAPORATORS

ON HAVING to remove the low side float evaporator for the second time due to oil logging, we inserted a length of copper stranded aerial wire in each tube from the float header. The wire is pushed into the tube until it comes out the other end, then the ends are frayed out. The capillary action will return the oil to the float header where it will normally be returned to the compressor. This expedient has always worked entirely satisfactory for me. *Submitted by George Broadbert, Jr., West Frankfort, Ill.*

Commercial Selling

How to increase business by doing a more effective job of selling

Domestic Service Streamlined by

COMMERCIAL SERVICE COMPANY

By Robert Latimer

ONE of the worst problems of the former commercial refrigeration service firm in going into the domestic field, unprofitable jobs which cannot be handled in the shop, has been eliminated by an outside "contact man" at Bonded Refrigeration Company, Fresno, California.

President Homer Creley of this San Joaquin Valley organization began his refrigeration experience in strictly high-horsepower, heavy tonnage cooling fields, being interested from the outset in setting up an efficient commercial refrigeration service only.

Commercial Work Kept Shop Busy

During the prewar years his efficient shop was busy with all types of commercial work, including store and restaurant walk-in boxes, storage refrigeration, and general refrigeration above the two or three horsepower classification. In addition the company made a specialty of designing, installing and maintaining wine coolers, large-scale systems for chilling the millions of gallons of wine produced in the Fresno district each year. These fields, properly solicited for both new installation work and maintenance, provided plenty of work for a seven man crew and two designing experts.

"We were more than satisfied with the progress we were making," Mr. Creley explained "and were staying religiously away from domestic refrigerator repair work, simply because we felt that the smaller firms with less equipment could more reasonably handle this work, and leave our facilities free for more important commercial service."

When Pearl Harbor came along, as a result of the above specialization in the commercial field, Bonded Refrigeration Company was accepting only about 50 domestic refrigerator repair jobs a year—and most of those on an "accommodation basis" for friends, or customers in the commercial bracket who asked Mr. Creley to use his excellent facilities for repairing their own home boxes. The shop, averse to tieing up mechanics on this kind of work, discouraged too much of this type of service. Now, after three years of war Bonded Refrigeration Company is currently averaging 800 domestic refrigerator repairs a year, and expects the figure to go even higher for 1945.

Forced Into Domestic Service

This 800-a-year volume has been necessitated both by public pressure on the shop, and the cutting down of commercial refrigeration which meant less large scale work, according to Mr. Creley. "If I had had my way about it, we would never have entered the field at all" he indicated "But almost immediately following our entry in the war it became evident that we would have to do so. Simultaneously with increased demand for fixing up the old box from domestic customers, we found a letdown in demand

for commercial work as many butcher shops, wineries, etc., were closed up or converted to some type of situation requiring little or no refrigeration. Many of the wineries, for example, went into the manufacture of industrial alcohol and gave up palatable wine production altogether. Thus we saw that it would be necessary to step up our domestic work, and in fact go out for it just as strenuously as we had formerly solicited commercial work."

Accordingly, the Bonded Refrigeration organization has revamped its entire structure to meet the domestic-work market all the way. The shop, incidentally, is one of the most cleanly and attractive such in California—all work benches, tools and the floor scrupulously mopped daily with cleaning solvents to remove oil and grease, then polished down. Mr. Creley feels that this is an important point in building up his reputation with women customers who come into the shop. Since going heavily into the domestic field, much of the heavy-work equipment has been moved out and neat workbenches and test apparatus for home refrigerator repairing substituted. Currently Bonded Refrigeration Company is splitting its volume about equally between commercial and domestic work, and the shop is well equipped to handle both.

Contact Man Checks Jobs

Perhaps the most important change in setting up all-out domestic business has been the use of a veteran "contact man" to solve the transition problem for the shop. Like many others in the same situation, Mr. Creley found it difficult to judge costs and labor for various kinds of work. Veteran mechanics accustomed to shop work were unfamiliar with going out to a Fresno home to work on refrigeration in the kitchen, and to be truthful, were not pleased with the role.

Added to that, finding that some of the refrigerators concerned were too difficult to repair in the home, they were sending these in via pickup truck—only to discover later on that the box could not be repaired, and that the firm was out the cost of picking up and delivering the refrigerator. Many mistakes were made until Mr. Creley hit upon the idea of a full-time representative of the firm, thoroughly experienced in all makes of domestic refrigerators, who could answer calls, and pass on every job before it was accepted.

"We believe in doing 90 per cent of our repair work in the shop," Mr. Creley pointed out, "after our early experience demonstrated that most repair jobs involve a lot of careful steps which could best be handled by bringing the box in. Therefore, we must know in advance that we won't take in one which we cannot repair for one reason or another. Not only do we lose money, but waste valuable time which might have been spent profitably otherwise. When our contact man makes his visit to the home, a quick inspection will usually show whether we are qualified to take the job or not. Moreover, carrying an ample supply of tools with him in the car, he can take care of minor repairs on the spot—actually doing enough of this work to pay for his time. When he is not actually answering calls which come in, we can use his time in the shop filling in with the regular shop crew. Lastly, we can schedule his calls to coincide with slack periods and thus produce the most revenue work for every hour concerned."

Since developing this plan Bonded Refrigeration Company has turned down numerous odd-brand refrigerators, or those with units which cannot be repaired, and thus saved a lot of valuable time. At the same time, the contact man has been able to turn out hundreds of small repair jobs without affecting the time of experienced mechanics who are needed in the shop.

S S S

John Drotoas
Cleveland 9, Ohio.

"Incidentally, I consider this Refrigeration Magazine the finest I have ever known and look forward to receiving each copy."

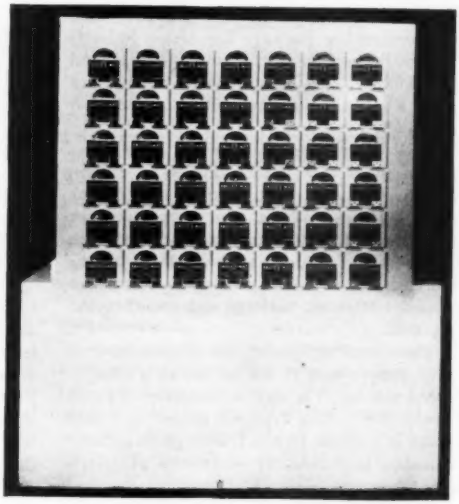
Close-up view of Frez-O-Mat, showing customer selecting the frozen food she wants simply by opening the compartment door and picking up the food package. An automatic ejector tips the package over into her hand and brings another one into place, ready for the next sale. This cabinet for self-service stores consists of numerous compartments, each being stocked with a different frozen product.

Self-Service for Frozen Food Buyers

KNOWN as the "Frez-O-Mat," a new device for marketing frozen foods in self-service stores has been developed by the 20th Century Marketing System of Denver, Colo. Because of present conditions, the unit cannot now be manufactured for distribution, but at least it gives a good indication of what may be expected when materials are available.

Speaking for the concern, Milton Rifkin says the purpose in developing this unit was to sell more package frozen foods, as well as ice cream, in self-service stores. To do this it was necessary to create a dispenser which would be enticing to the shopper and at the same time eliminate the many sales and operating barriers existing in the present standard type storage cabinets.

As shown in the accompanying photographs, the merchandise is actually displayed and accessible. Each commodity is in a separate compartment, each compartment has a door, the door is an actual facsimile of the package. Customer stands erect to make her selection and merely pulls open the door containing the frozen food she wants, and the automatic ejector tips the package over into her hand, and at the same time brings another package into place ready for the next sale. The cabinets have a storage and miscellaneous section directly below the bottom row of drawers.



At the right is a general view of Frez-O-Mat set on white enamel base. Lower section used for storage.

The Frez-O-Mat eliminates stooping for packages, opening and closing of heavy doors, reluctance of opening doors, fear of leaving doors open too long, not knowing just which door to open for merchandise desired, searching for items and price, broken finger nails, chilled hands, disorderly arrangement of packages, necessity of asking clerks questions, etc.

Due to the method of refrigeration, it is claimed, there is no condensation, frosting or accumulation of ice within the food compartments, or around the door or door openings, or packages. This solves the problem of defrosting.

Being of vertical construction it economizes on floor space by utilizing height. It does not accumulate dirt, the interior never has to be cleaned, there are no mirrors or glass to be cleaned and constantly polished. It is mobile and may be moved to various parts of the store. It may be used to form island displays, or in conjunction with standard shelves. The dispenser creates an impression of mass display and has constant sales appeal. Its attractive appearance and the unusual method of obtaining merchandise is expected to interest shoppers.

Ice Cream Dispensed

Ice cream may be dispensed from this cabinet along with other frozen foods or a twelve door unit (more or less as desired) may be constructed solely for dispensing ice cream. It is believed that this dispenser will make it possible for the first time to merchandise package ice cream in self-service operation by actual display and accessibility, and at the same time place it in a definite category as a staple food commodity.

Sales of package ice cream as well as frozen foods may not be limited to certain outlets, but like soft drinks and similar items sold everywhere. In cases where ice cream or frozen food manufacturers furnish cabinets and desire the controlling of the merchandise to be dispensed, the dispenser is so set that his package and no other can be used.

The construction of the Frez-O-Mat is very simple and is not at all of a complicated nature. The unit is adaptable for coin mechanism. This type of operation would make it possible to sell frozen package merchandise in lobbies or basements of apartment houses.

At the present time, due to war conditions, plans for manufacturing the Frez-O-Mat have not been decided upon. The unit has been demonstrated to various large manufacturers however and it is expected that when materials are available a plan of production will be worked out.

S S S

ARMY OPERATES REFRIGERATED STORAGE IN NORMANDY CAVE

THE 4168rd Quartermaster Refrigeration Company believes it operates the Army's most unusual cold storage plant. It uses three vast tunnels, 50 feet underground and opening on the face of a Normandy coastal cliff, for storing as much as 3,000 tons of fresh meat at a time.

The caves were excavated by the French about 1928 for use as ammunition dumps. Following the Normandy landing, Engineers installed a system of overhead ammonia pipes and a freon cold-blowing apparatus which maintains a constant temperature of about 14° F.

Each tunnel is about 250 feet long and 80 feet high with four sizeable lateral bays leading off on either side of each passage. Operating on a round-the-clock schedule, the Quartermasters receive the meat by truck directly from refrigerated vessels, stack it in the bays, and reissue it to the big refrigerated vans for the journey to the front.

For purposes of easy inventory and rapid loading, sometimes as many as 50 vans are lined up for their allotted portions, only one type of meat is stacked in a bay. These types include pork, beef, poultry, frankfurters, bologna, etc.

All broken cases are checked for spoilage. This work is performed by an officer who was a veterinarian in civilian life, assisted by seven enlisted men who were butchers.

S S S

James W. Southouse,
Bridgeport, Conn.

Your magazine has been put to new use by me. I am a discharged veteran studying mechanical engineering at present and intend to major in refrigeration and air conditioning in my last two years of college. Formerly employed by Jack Josephson of this city, I am interested in keeping in touch with the business. Your magazine has furnished me excellent material for speeches in English class.

JOBBER IN MODERN NEW STORE

A MODERN refrigerator service and parts store, planned for eye appeal as well as efficiency, was established in 1944 at 944 South Grand Ave., Los Angeles, Calif., by the United Commercial Sales Co. Pictures of this establishment show that it certainly does have eye appeal.

Front view of United Commercial Sales store, 944 South Grand Ave., Los Angeles, Calif.

The company converted its business from that of distributor to jobber in the early part of 1944 and before going into larger quarters, A. H. Reinach, manager of the Wholesale Division, visited many of the jobber set-ups throughout the country, many of which, he said, showed evidence of simply growing without much thought of modernization.

Lobby and sales counter of United Commercial Sales, Los Angeles, Calif.

Mr. Reinach gave a great deal of thought to the layout of the new establishment, not only from the standpoint of modernization and eye appeal, but also to improve efficiency of operation through proper lighting and sufficient working space in the aisles. After several months experience, it has been found that these modern ideas pay many dividends. This is one of the most modern layouts on the Pacific Coast, according to opinions expressed by many visitors.

The territory covered by this concern is principally Southern California, Arizona and Southern Nevada.

S S S

PRIORITY MERCHANDISING PLAN HAS ITS DRAWBACKS

MAJOR appliance dealers who rush into "priority plans" guaranteeing early delivery of new appliances to preferred customers are letting themselves in for many headaches, according to Tony Fernandez, major appliance manager at Godschaux' store, Fresno, Calif.

There's a lot more potential ill will and danger in these ideas than good will, Fernandez pointed out. Because every housewife who registers her name with the dealer we feel that the moment a few appliances are released in the city, she should have one. If ten refrigerators are sold, the customer holding priority number twelve will feel that she has been cheated, and grow angry enough that she will never forget. A lot of people are going to lose their tempers over situations of this kind, until the chances are that most of the names on the list will represent liabilities instead of goodwill assets.

Cash on Line Is Worse

It will be even worse if cash is involved in the priority plan. Unquestionably customers are willing to lay money on the line, even anxious to do it. They feel this will help insure their receiving the very first refrigerator possible, but at the same time it tempts the dealer to sell his quota first to other customers, because holding the depositor's token payment, he is sure that they will buy. Many dealers, it is said, are taking cash deposits in this way, and hope they come out on top.

Mr. Fernandez likewise feels that many customers upon hearing of the offer will register a number with as many dealers as possible, secure in the knowledge that they can take whichever cabinet is offered them first. In this way the prospect list compiled is actually false value, and cannot be depended upon for making up merchandising or inventory plans.

(Continued on page 44)

Army Refrigeration Specialists Study Food Service Program

"IN THESE days of strict civilian food rationing the public is extremely critical, and it is of the utmost importance to civilian morale that the public be informed of the objective program which the army's highest headquarters are actively promoting in every unit, in the interest of food conservation," said Brig. Gen. H. V. Beyette, personal representative of Lt. Gen. Brehon B. Somervell, Commanding General of Army Service Forces, before the Army Food Service Refrigeration Conference, held February 19 at the Edgewater Beach Hotel in Chicago.

This conference was devoted to that phase of the Army Food Service Program which pertains to the technical utilization of refrigeration facilities by the Army in all its installations and in the rail and marine facilities used for the shipment of perishable food supplies.

"Correct refrigeration," continued Gen. Beyette, "is absolutely vital to conservation of perishable foods. It prevents spoilage and consequent wastage that might otherwise occur."

Civilian Experts Meet

Highlighting refrigeration, the Conference brought together nationally prominent commercial refrigerated warehousing specialists, meeting in collaboration with high ranking Army officers connected with the Army Food Service Program. These civilian experts in the field of refrigeration, appointed by the Secretary of War, are serving as consultants to augment the existing Army Food Service Staff. Of them Gen. Beyette said, "You gentlemen are to be congratulated upon your fine contribution of time, effort, and advice. The Army is most appreciative."

Refrigeration problems that concern the Army's preservation and conservation of perishable foods were discussed in detail at the Conference. Much valuable interchange of thoughts was derived from the discussions, and delegates to the conference took many valuable ideas for improvements in this very vital program within the Army back to their individual stations. Civilian consultants were present at the Conference from each of the Army's nine Service Commands, each of these Service Commands representing a geographic area subdividing the United States as a whole. Each civilian consultant works with the Army Food Service Staff in his particular Service Command on the problems of refrigeration encountered, striving always to bring about improvements in facilities and methods of operation.

Maj. Gen. Carl A. Hardigg, Director of the Subsistence Division, Office of the Quartermaster General in Washington, also addressed the Conference. Gen. Hardigg's Subsistence Division has the Army Food Service Branch as one of its subdivisions. He revealed that "70 per cent of all food eaten by soldiers in this country is of the perishable variety" and that steadily increasing amounts are going overseas to our front line fighters.

Officers Need Technical Knowledge

Gen. Hardigg indicated that the Army's officer personnel in charge of operating refrigeration facilities are doing their utmost in execution of the responsibilities of their jobs, but they lack technical knowledge in many cases, and that is where the value of civilian refrigeration consultants comes into the picture. Gen. Hardigg called on the civilian consultants to not "pull their punches," but to tell the Army just exactly what they find wrong in the Army's refrigeration facilities and methods, for the Army needs and wants constructive criticism.

Lt. Col. Ward B. Cleaves, Acting Chief, Food Service Branch, Subsistence Division, Office of the Quartermaster General, presided at the conference, and also gave a comprehensive description of the Food Service Program in its broadest aspects. Col. Elmer K. Pettibone, Director of Food Service in the Ninth Service Command, described the operation of the Food Service Program "within the Service Command." Brig. Gen. Wilbur R. McReynolds, Air Quartermaster, Army Air Forces described "Refrigeration in Class III Installations," these being Army

(Continued on page 44)

QUESTIONS AND ANSWERS

On Problems of Servicing, Installation and Maintenance of Household and Commercial Refrigerating Equipment—Send Your Problems to the Question Box.

CORRECTION FOR QUESTION 644

Willis Stafford, now in the U. S. Navy San Diego repair base, proves that he is keeping up on the refrigeration industry and service problems by submitting the following correction for the question and answer section.

The answer to question 644 is confusing in that it suggests setting the thermostat by the pressure instead of setting to the desired temperature.

GRUNOW ERRATIC OPERATION

Question 655: Could you suggest the cause and cure for the following trouble with a Grunow? I have had several act this way the past summer and all but two have corrected themselves. Both are "D" units and I have completely rebuilt the compressor, placed new dehydrators, meters, carrene and on one a condenser. The fans are O.K. I have checked the charge and changed carrene.

One machine with a new condesner will cycle and frost nicely on the warmest setting but if set on normal will run and defrost as though not circulating. The other may run and cycle 100 per cent for as long as two or three weeks, then will run and defrost while running for several days. If they are stopped for two hours and started, they seem O.K. for a while. It seems like moisture but the dehydrator should absorb the moisture in three months. I did notice if the evaporator has ice cream or frozen meats, it seems to cause this.

Answer: The particular trouble you are having on both of these units could be due to one of three things: first, and most likely, is moisture; second, improper oil which is congealing in the capillary tube; third, air in the system. Even though you have included a dehydrator in both of these systems it is possible that the dehydrator has taken up all the moisture it is capable of taking up and there is still moisture circulating through the system. It may become necessary to insert another dehydrator in order to absorb the additional moisture.

I note that in both cases it seems that the trouble develops when the lower temperatures in the evaporator have been reached, which may indicate that oil is congealing in the capillary tube, restricting the flow of refrigerant. Moisture, of course, can do the same thing by freezing at the outlet of the meter or in the capillary tube. Air in the system can cause the same trouble and would not be noticed because at the lower temperatures the head pressure would probably be reduced and air in the meter would trap the liquid refrigerant and at the reduced head pressures there may not be sufficient pressure to force it through.

The type of meter used in these units will determine to a great extent whether or not air could cause the trouble. If the meter employs the high side float, air can definitely be a possibility. However, if the meter is nothing more than a capillary tube the air may not have that effect. Shortage of carrene would not necessarily cause the unit to completely defrost. It may defrost the top of the evaporator and may cause the machine to run excessive periods but should not cause it to run continuously and defrost entirely.

WHEN TO CHANGE DRYER

Question 656: I have read a lot of articles on dryers in regards to having taken up their capacity of moisture. What I would like to know is how can one tell when a drier needs to be changed, other than having symptoms of moisture, that is in the system at the valve? Is there a different color to the drying agent?

Is there any literature available that would give me a thorough understanding as to when a dryer should be discarded?

Answer: There is only one dehydrating agent on the market which gives a color indication of moisture present and that is Drierite. Calcium chloride provides an indication due to the condition of the material after it has absorbed considerable moisture. This material will usually disintegrate to a large extent and where a large amount of moisture is present it will impregnate the solution with water.

Silca-Gel will provide no visual indication of moisture content, and with all these dryers it is usually necessary to use good judgment

in the operating indications of the machine, in order to determine when they must be changed. It is usually good practice where a large amount of moisture is suspected, to change the dryer within twenty-four hours and every few days thereafter until such time as the indications are that no moisture is present. Common practice is to allow the dryer to remain in the system even after all moisture has been absorbed.

NORGE CHANGE-OVER PROBLEMS

QUESTION 657: The company I work with are distributors for Norge domestic appliances. We also do all service work but are unable to get some standard parts to keep the units operating as standard equipment. We have changed several Norge units from SO_2 to methyl chloride or Freon-12 and would like to know if there is any possibility of doing damage by these change-overs?

ANSWER: Insofar as we are able to determine, we do not believe that the changing of Norge Units from SO_2 to Methyl Chloride or Freon-12 will have any detrimental effect on the parts in the system. It is quite possible you will experience difficulty in proper oil return from the evaporator because of the oil remaining in solution with the hydro carbon refrigerants. The calibration of the low-side float for Freon is very similar to SO_2 calibration therefore it should work satisfactorily.

When changing from SO_2 to Freon or Methyl, the compressor imposes an additional load on the motor. In changing over to the other refrigerants, we would suggest a smaller pulley on the motor to compensate for the additional load. Reducing the compressor's speed in this manner will bring the final capacity back to normal SO_2 rating.

We would suggest you check the oil level in the Rollator about two weeks after it is put in service and again in about two months to make sure the oil is adequate for proper lubrication.

REFRIGERANT USED IN CROSLEY

QUESTION 658: What kind of refrigerant does the Crosley sealed units use? Will an Imprial adapter set fit the float service valve or is a special adapter necessary?

ANSWER: According to the information we have on Crosley units, the sealed unit uses Freon-12 as the refrigerant. It is our understanding that many of the standard hermetic valve kits have adapters for Crosley units.

EXPANSION VALVE LOCATION IN FROZEN FOOD CABINET

QUESTION 659: I would like to know where the expansion valve should be located for use on a frozen food cabinet; also, what is the best location for the thermostat control bulb.

ANSWER: In the average frozen food cabinet, the thermostatic expansion valve is located outside of the refrigerated space. It is usually boxed in and surrounded with loose insulation to prevent excessive frost formation and as a result, water dripping during the off cycle. Under certain conditions, a vapor charged power element will become colder at the valve than at the bulb if the valve is in the refrigerated space. When this occurs, the valve becomes inactive. Valves having liquid charged power elements are not generally used on low temperature cabinets because they do not limit the back pressure when the coil is warm.

The thermostat bulb can be placed in any convenient location where it will react to the temperature drop in the refrigerated space or evaporator. If the bulb is in contact with the evaporator, it must be adjusted to a lower temperature than the desired cabinet temperature because the evaporator of necessity must be colder than the cabinet. Adjusting the thermostat can be done after the cabinet has become cold.

DISPLAY CASE WILL NOT WORK

QUESTION 660: I have three display cases and a walk-in cooler on a 1½ H.P. unit. The center meat case has been giving trouble for the past year by frosting correctly for about one week, then only the top coil will refrigerate. I have installed three new valves on this case and each time the same trouble develops. The sight glass shows an adequate amount of refrigerant, so I am sure this is not the trouble. I have installed a Trap-it just ahead of the valve and an over-size dehydrator in the main liquid line.

ANSWER: I believe your problem on the display cases may be due to oil accumulating in the coil resulting in a slightly greater pressure loss through this coil. The oil accumulation may be caused by a limited amount of dispensing from this case. Not being familiar with the prevailing circumstances and the system hook-up, I can only suggest you try additional loading of this case by suggesting it be used more than the other two; also, the expansion valve may be controlled by the capillary tube contacting some other coil or tube near the inlet to the evaporator.

Modern Farmer Knows Value of Refrigeration

THE snow-white, orderly buildings of George Hausman's poultry and fruit farm in fertile Lehigh County, Pa., bespeak prosperity. Peach and apples trees flourish in hundreds of neat rows; pure-bred leghorns supply up to 3000 eggs a day to the markets of New York and Philadelphia. Yet, like many farmers, Hausman started out on a shoestring and a mortgage. That was twenty-five years ago. Today he is entirely clear of all indebtedness, and his net income runs into five figures. His yearly output averages 12,000 bushels of peaches and apples, 85,000 dozen eggs, 2000 fowls, 90,000 day-old chicks.

The story of George Hausman's success is the familiar story of an energetic business man, working under the American system. It is also the not quite so familiar story of how electric equipment can contribute to prosperous farming. Here's his story as told to G. A. Rietz, Manager of General Electric's Farm Industry Division.

"At 25, after a few years of share-cropping, George Hausman decided to buy his own farm. He had no money but, remembering the old saying that a mortgage beats all woes of the farmer, he borrowed a thousand dollars, took out a first and second mortgage, and paid $5000 for an 80-acre, run-down farm near Coopersburg, Pa. It was generally agreed that George had been 'stuck.' After three years the first mortgage was due; the little money he had made

Above: A chilly place even in summer is the room where graded and packed fruit is placed. Ideal storage temperature and humidity are maintained automatically.

Left: Esther Hausman puts a package of meat in the home freezer. The Hausmans find this unit invaluable for keeping their own food.

had been put back into the farm, and the specter of foreclosure loomed. But Hausman hustled around, did some persuasive talking, and succeeded in having the place refinanced.

Installs Electric Plant

"That was in the early twenties. A few years later Hausman, after careful investigation, decided to try to electrify his farm. If ever a man needed the courage of his convictions, Hausman did at that time. Unable to secure the full cooperation of his neighbors so that a power line could be built, he scraped together a thousand dollars to invest in an electrical plant of his own. A month's use of electric power convinced him that he had gambled wisely. There was only one thing wrong with his electric plant, it didn't furnish enough power for all the equipment he wanted.

"Deciding on another bold step, he again visited the local power company and asked what monthly minimum he would have to guarantee to obtain high-line service without the help of his neighbors. Thirty dollars was the figure; Hausman agreed. (It cost him $21 a month to run his own inadequate plant.) It was only for four months that he had to make this payment. By that time the other farmers were sold on the advantages of electricity, jumped on the band wagon and requested electric service.

"Hausman continued to boost his production and improve his farm. His wife worked beside him. As his five children grew old enough, they too took over a share of the tremendous job of intensive production on this 80-acre farm. Family teamwork has played a big part in the success of the Hausman business. Pride of ownership is plainly evident in the immaculate neatness of the well-kept houses and grounds.

Complete Electrification

"Today, in addition to good lighting throughout his home and farm buildings, George Hausman uses electricity to operate 22 motors, 12 heating devices, a good-sized refrigeration system, an automatic water system, chick brooders and incubators, and a host of other equipment. The Hausman farm has an electrically driven machine for grading and washing peaches, one of its important crops. Mrs. Hausman's kitchen is all-electric, and a home freezer in the fruit cellar keeps vegetables, fruits, pastries, and meats for use throughout the year. Mr. Hausman's workshop is well supplied with electric tools, including a soldering iron, portable drill, grinder and buffer, and an air compressor. He expects to make an electric welder his next addition."

S S S

PRIORITY MERCHANDISING PLAN

(Continued from page 39)

"I've found that the average prospect does believe in the priority plan all right," Mr. Fernandez admitted; "which makes it worse if the dealer is forced to disappoint them. We all know that the manufacturer is going to have to release new lines on a quota basis for some time at least, and that therefore we cannot begin to supply the demand, priority or no priority. It will not require any advertising or promotion of any kind to sell off the first stock received. I know from experience how quickly such news gets around. I received two dozen used boxes last winter which I intended to use as a spring promotion. On the first morning I had them more than sixty women came in to buy, snapping the stock up by noon. No announcement had been made— the news simply got out and customers flocked in.

"Consequently we're going to simply sell on a first-come first-served basis, which entails no goodwill risks and will offend no one. This will eliminate all the paper work and extra bother which a priority plan naturally causes. That's the best re-entry into selling new appliances again."

S S S

ARMY REFRIGERATION SPECIALISTS STUDY FOOD PROGRAM

(Continued from page 40)

Air Force posts, camps and stations. John Hawkins, Refrigeration Specialist, Subsistence Division, OQMG, Washington, D. C., and Vallee O. Appell, Andrew J. Crotty, Jr., and John McCarthy, civilian consultants available to the Food Service Branch, Subsistence Division, Office of the Quartermaster General, then spoke from the consultants' viewpoint as seen from headquarters in Washington. Major John L. Barnhart, Chief of the Refrigeration Section, Food Service Branch, Subsistence Division, Office of the Quartermaster General in Washington spoke in detail fashion of the "Mission and Functions of the Refrigeration Program."

Quartermaster Corps Develops Portable Ice Cream Machine

A FORTY gallon ice cream machine recently developed by the Quartermaster Corps, will make fresh ice cream available to troops stationed in jungles and other remote locations. The miniature ice cream factory complete with cold storage compartment, weighs 1200 pounds, occupies a minimum of space and can be transported by truck or plane.

Powered by Electricity and Gasoline

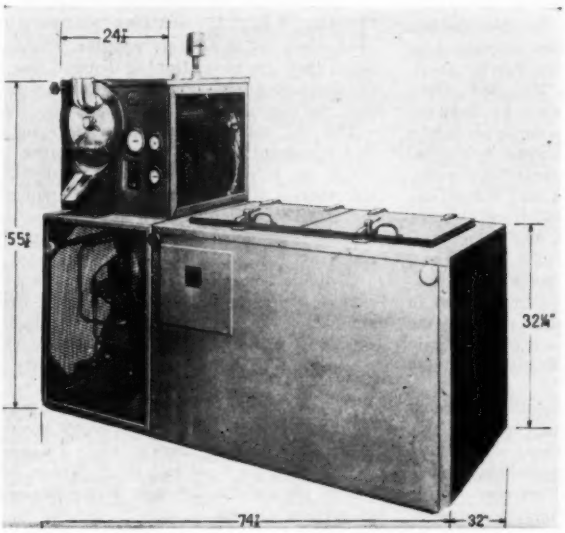
Seventy-nine inches long by 32 inches wide and 55½ inches high, it is equipped with both a five horsepower air cooled gasoline engine and a three horsepower electric motor, so that it may be powered by electricity or gasoline, depending on field conditions. The frame and sheathing are aluminum and the cellular rubber insulation is half the weight of cork. Handles on the sides make movement by hand-carry possible.

The freezer has a capacity of 2½ gallons, and will produce a semi-frozen mix from the freezer in from seven to 14 minutes, depending upon the outside temperature. It will operate in temperatures up to 120° F. When ready, the mix, in its semi-frozen state, is drawn off through a spout into half pint cardboard boxes which are then placed in the cold storage cabinet to harden.

The material used is a powdered ice cream mix, also developed by the Quartermaster Corps, to which nothing is added but an equal volume of water. The mix is furnished in vanilla only, but other flavors may be added on the spot if desired and available.

Storage Holds 40 Gallons

The capacity of the storage cabinet is 40 gallons either stored in five gallon cans, or packed in the square half pint containers, but the freezer can produce twice as much as that in an eight-hour shift. For large detachments, it is recommended that the machine be used in conjunction with the regular 25-cubic foot portable refrigerator where one is available. This combination can produce 80 gallons or 1,280 half pint packages per day.

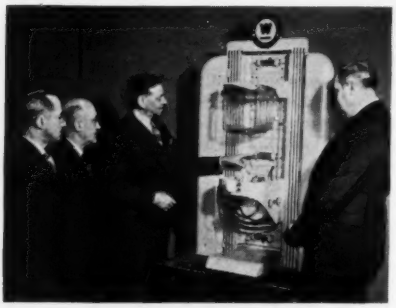


This miniature ice cream factory, complete with cold storage compartment, weighs 1200 pounds, occupies a minimum of space and can be transported by truck or plane.

Roy Slaughter and Earle R. Buck have published a certificate that they are conducting business under the firm name of Los Angeles Refrigeration Sales and Service at 1515 West Eleventh Street, Los Angeles, California.

WESTINGHOUSE OPENS CONSERVICE SCHOOLS

WESTINGHOUSE "Conservice" schools on refrigeration will include a half-day session devoted exclusively to commercial refrigeration. Other features of this year's schools will include a 30 minute sound motion picture in color depicting how good services builds good will and illustrating the steps in training an inexperienced service man just starting out on home service calls; and also a sound slide film 30 minutes long

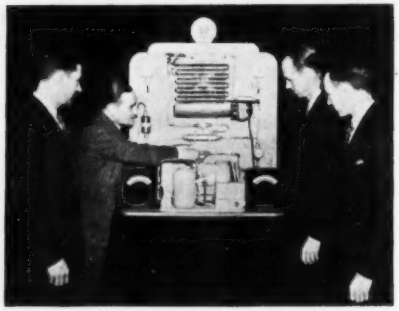


Examining the new Domestic Refrigerator Demonstration Board are (left to right) Paul D. Bowles, Philadelphia; J. F. Hendrickson, New York; William Robertson, East Springfield; R. H. Gordan, Philadelphia.

on "The Refrigerator Temperature Control." These schools will be sponsored throughout the country by distributors for their dealers and dealer servicemen, it was announced by L. K. Baxter, manager of the Service Dept. of the Appliance Division, Mansfield, Ohio.

In addition to the films, some 24 diagnosis charts, some in colors and some in black and white, are available on domestic refrigeration covering the cycle, the temperature control, unit trouble diagnosis and correction, and analyzer checks for the electrical circuits. Seventeen similar charts are on refrigeration specialties, 14 charts cover milk coolers and 11 charts are prepared on portable air conditioners. True and false quizzes, similar in scope to the popular checks used at the end of previous conservice schools are again included in the Westinghouse instruction material.

An additional visual education board is devoted to the temperature control. This board mounts a giant working model with each part readily distinguishable when placed before the class. Going a step farther, a commercial refrigeration demonstration board is to be used on which is mounted a compressor, fan cooled condenser, heat exchanger, gauges, and electric meters.



Commercial refrigeration is included for the first time in the new Westinghouse Conservice course. J. A. Vasser, Assistant Service Manager, is pointing out several features to C. E. Badger, E. H. Filipak, and P. E. Stewart, all Staff Service Supervisors.

Westinghouse distributors will begin holding schools on April 2, Mr. Baxter said, and plan to hold approximately 300 schools for more than 10,000 service men and women where refrigeration equipment and other appliances including electric ranges and electric water heaters, will be demonstrated.

S S S

Y.M.C.A. SCHOOLS ANNOUNCE COURSES IN REFRIGERATION

THE Y.M.C.A. schools refrigeration courses are immensely popular. Furthermore, they are in continuing demand due to the shortage of men qualified to keep present day refrigerators functioning efficiently.

The "Y" schools announce a more inclusive refrigeration course than heretofore offered. A 16-page catalog giving detailed information will be sent to anyone requesting it. The scheduling of new classes has been so conducted as to take care of the needs of:

Civilians who can attend only a few sessions a week; those (especially out-of-town students) who are anxious to complete the course in as short a time as possible. This requires full time attendance amounting to 30 hours a week.

Defense workers, especially those on night or odd-time shifts who consequently are not able to attend more than 3 hours a day.

Veterans, part or full time. Those employed during the day may secure training in evening classes.

SERVICE IMPROVEMENTS ADVISORY COMMITTEE UNDERTAKES IMPORTANT WORK

MEMBERS of the Refrigeration Service Engineers Society have on numerous occasions offered suggestions as well as complaints which ultimately lead to improvements in design and arrangement of equipment in the interest of improved field service and the replacements of parts. To correlate this information and formally present it to the manufacturer, the Service Improvements Advisory Committee has been formed.

CARL L. OLIN

Headed by Carl L. Olin, assistant sales manager of Servel, Inc., Evansville, Indiana, who for many years was national service manager for this company, this committee has undertaken the task of offering suggestions on such points as accessibility for servicing instructions covering the product, uniform name plate data covering such items as refrigerant to be used, capacity of unit and compressor speed at several common back pressures, receiver capacity, electric accessories—repair or replacement and general repair and replacement policy.

Mr. Olin has issued a bulletin to his committee members requesting pertinent information on several of the above subjects, including accessibility and instructions covering the product. The committee will be enlarged in order to secure representatives from various parts of the country.

Present members of the Service Improvements Advisory Committee include:

A. W. Albertsen, 206 W. 8th Ave., Huntington, W. Va.

S. Archibald, 1920 W. Olympic Blvd., Los Angeles 6, Calif.

T. L. Arnett, 51 Aikins St., Winnipeg, Man., Canada.

Harry A. Bortz, 5452 Penn Ave., Pittsburgh 6, Penna.

Lynn Bradison, 4152 20th Ave., S., Minneapolis 7, Minn.

H. R. Brewster, 3928 4th St., Des Moines 13, Iowa.

G. H. Brock, 115 E. 3rd St., Dayton, Ohio.

J. Canty, 874 Spencer St., Toledo 9, Ohio.

Warren W. Farr, 1127 Carnegie Ave., Cleveland, Ohio.

Earl Jennings, 47 Piquette Ave., Detroit, Mich.

Vernon Jennings, 1606 Dresden St., Evansville, Ind.

S. C. Mathias, 600 March St., Shillington, Pa.

Raymond Mozley, 2401 N. Leffingwell Ave., St. Louis, Mo.

J. Donald Munson, 13-15 Huston St., Wilkes-Barre, Penna.

J. B. Ottenheimer, 3508 Forest Park Ave., Baltimore, Md.

W. M. Prack, 321 E. Grand Ave., Chicago, Ill.

C. Racioppa, 106 Monarch Park Ave., Toronto, Ont., Canada.

Ed Rawls, 237 S. Pryor St., S.W., Atlanta, Georgia.

J. M. Richey, 30 West 14th Ave., Denver 4, Colorado.

Karl F. Schoeller, 101 S. 5th St., Perkasie, Penna.

Richard Smith, 1833 N.W. 39th St., Miami, Florida.

C. J. Tredwell, 16 Quinpool Road, Halifax, N.S., Canada.

Garritt Van Ginkle, 1631 Pacific Ave., Long Beach 6, Calif.

Cecil R. Visger, 7715 Brooklyn, Kansas City 5, Mo.

G. D. Wang, 5106 Santa Monica Blvd., Milwaukee 12, Wis.

Thomas Whalen, 104 Sherwood Ave., Toronto, Ont., Canada.

NEW INCORPORATION

ARTICLES of incorporation have been filed in the Wisconsin secretary of state's office for the Long Refrigeration Sales and Service Company, Inc., of Kenosha (Wis.). Incorporators were Herman J. Long, Charles A. Lepp, and Dorothy H. Murdoch.

YOUR REFRIGERATION SERVICE MAN IS YOUR BEST FRIEND TODAY...!!

YOUR REFRIGERATION SERVICE MAN IS YOUR BEST FRIEND TODAY...!

CALL HIM REGULARLY, AND FORESTALL MAINTENANCE TROUBLES

WITH NEW EQUIPMENT and parts for your refrigeration system unavailable or difficult to obtain, PROTECTION of your present system is VITAL. That is why your Service Man is your BEST FRIEND these days — he keeps it running efficiently and dependably.

By installing an "A-P" TRAP-DRI in your system, you forestall losses from freeze-ups, clogged lines, shutdowns. For TRAP-DRI'S combination Filter, Strainer and Dryer STOPS dirt and other foreign matter from penetrating your system — insures smoother, faster valve action and maximum coil efficiency.

Ask your Service Man about "TRAP-DRI" and "A-P" Dependable Valves.

AP "Trap-Dri" System-Protectors. Combined dryer and strainer. Stops dirt, solder particles, acids and moisture.

AUTOMATIC PRODUCTS COMPANY

2454 N. THIRTY-SECOND STREET MILWAUKEE 10, WISCONSIN

For your information this is the type of message we are telling in mediums reaching the consumer.

DEPENDABLE

REFRIGERANT VALVES

Stocked and Sold by Progressive Refrigeration Jobbers Everywhere — Recommended and Installed by Leading Refrigeration Service Engineers.

KROMER'S REPORT SHOWS MANPOWER SHORTAGE

THE increasing age of each refrigerating machine coupled with continual drafting of refrigeration service engineers or forcing them to enter other war industries is approaching a point where repairs needed to keep the equipment operating cannot be taken care of. Without refrigeration equipment throughout the nation, the entire food distribution system in this country would be inadequate.

All the conditions affecting the maintenance of refrigeration equipment have been analyzed in a report prepared by Ray Kromer of the National Refrigeration Service Council. Despite this comprehensive report accompanying the appeal to W.M.C. for reclassification of refrigeration servicemen from essential to critical, the council was denied the appeal. The refrigeration council planned to meet on April 3 in Cleveland to determine the course of action to take since being denied the appeal.

Mr. Kromer reveals that there are not enough service engineers to maintain the present refrigerating machines. Only about 6000 experienced service engineers of all ages are still engaged in doing service work. Local draft boards in some communities are withdrawing the remaining experienced men, regardless of their age and forcing them into other lines of work or drafting them into the armed forces. Less than 10% of the experienced men are under 30 years of age.

Even though refrigeration repair men are classed as essential, it has been pointed out that local boards themselves have the power to declare activities critical in the communities which they serve. Some consideration may be given by local boards if members of the refrigeration industry in their locality present well founded information on requirements for service engineers to care for refrigeration equipment in the community.

The National Refrigeration Council is making every effort to get the W.M.C. to change the listing of refrigeration men from essential to critical. They further recommend that government organizations fully cooperate in arranging for the return of experienced refrigeration men from the armed forces. Also that experienced men in the armed forces be used to maintain refrigerating equipment in military establishments. These two recommendations, if put into effect, would aid the industry in maintaining equipment that now averages 10 years of service.

FALL OF GERMANY MAY INCREASE REFRIGERATION DEMAND

ALTHOUGH some thought is being given to reconversion after the fall of Germany, it is expected that there will be very little, if any, reduction in demand for refrigerating equipment. Food and medical storage in the Pacific theatre is a far greater problem than that encountered in Europe. Recent reports from General Gregory indicates the urgency of using more refrigeration for the armed forces in the Pacific. Greater quantities of supplies will have to be transported and stored when the army moves into full scale action against Japan from island and China bases.

The problem of storing food in tropical climates envolves many difficulties that are not found under ordinary conditions. Storage must be immediately available throughout the year and of sufficient capacity to make flexible movement and adequate supplies possible.

HURRICANES IN A VACUUM

MANUFACTURED hurricanes roaring through a near vacuum at 70 below zero are now helping to make U. S. warplanes safer in the skies over Berlin and Tokio. The man-made wind travelling at 600 miles an hour is created inside a mammoth wind tunnel at Wright Field where York Corporation research engineers have made it possible to produce a stratosphere on earth with vacuum pumps and tons of refrigeration.

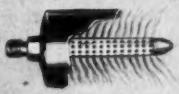
WPB SUSPENDS FIRM

CHARGED with violating a War Production Board limitation order on deliveries, General Refrigerators Corp., 678 Broadway, New York City, dealers in commercial and household refrigerators, has been suspended for six months starting February 14. The suspension was announced by R. A. McGovern, regional manager of the WPB Compliance Division.

Quirk's All-Australian Refrigerators Pty-Ltd., Melbourne, C1, Australia.

"We would like to place on record the fact that we find your little Journal of invaluable use here in Australia and our service men look forward with enthusiasm to its arrival every month."

Cross section of Type 743 Henry Dehydrator.



Greater Efficiency Because of Patented Dispersion Tube. Entire volume of the dehydrant is exposed to penetration by refrigerant.

Strainer Tube Can Be Easily Cleaned or Replaced. The reinforced monel strainer tube is silver soldered to the outlet fitting eliminating by-passing of the refrigerant.

Abso-Dry Pressure Sealing Process. Loosening of seal cap prior to installation produces hissing sound due to escape of dehydrated air indicating that dehydrant is absolutely dry.

One Piece Drawn Brass Shell. Type 743 Dehydrators in the 6" length are drawn in dies so that they have only one joint—larger

Easy to clean! Easy to restore to original efficiency by merely replacing the dehydrant! These are your first reactions when you remember field problems encountered in servicing Refrigeration and Air Conditioning installations. Apart from the refillable feature, however, Type 743 Henry Dehydrator should be the choice of anyone interested in more efficient removal of moisture in a system. This is because many of the standard Henry features of design and construction that have made Henry Dehydrators the choice of the Industry are incorporated in this refillable dehydrator. You will find these features described in detail on the left.

Type 743 Refillable Dehydrator is available in a series of sizes and capacities that will take care of the majority of commercial installations. Best of all, the unit is so reasonably priced that it will pay any service or contracting organization to use it as standard equipment.

ARMY E NAVY

HENRY VALVE CO.

EXPORT DEPARTMENT
13 E. 40th STREET
NEW YORK 16, N. Y.
Cables: ARLAB

HENRY VALVE CO.

3260 WEST GRAND AVENUE, CHICAGO 51, ILLINOIS

PACKLESS AND PACKED VALVES • STRAINERS • DRYERS FOR REFRIGERATION AND AIR CONDITIONING
AMMONIA VALVES • FORGED STEEL VALVES AND FITTINGS FOR OIL, STEAM AND OTHER FLUIDS

APPROVED FOR NAVY, MARITIME COMMISSION AND ARMY USE

Refrigeration Service Engineers Society

Official Announcements of the activities of the International Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.

THE OBJECTS OF THE SOCIETY

To further the education and elevation of its members in the art and science of refrigeration engineering; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

INTERNATIONAL HEADQUARTERS: 433-435 North Waller Ave., CHICAGO 44, ILL.

Annual Interprovincial Conference Attracts Record Attendance

Sixth Meeting at Montreal, Sunday and Monday, March 18-19, records important progress of Canadian R.S.E.S. Chapters

THE result of a well-planned educational conference by the Interprovincial Association and Mt. Royal Chapter, hosts to the Sixth Annual Conference of Canadian Chapters of the R.S.E.S., was evident when "standing room only" was available as President William Marshall, Toronto, opened the conference Sunday, March 18th and welcomed over four hundred members and guests, including fifty visitors from the States.

Secretary E. G. McCracken, Toronto, in presenting his annual report, reviewed a year of unusual activity, emphasizing the work of the association in securing recognition of the importance of the service industry in the civilian economy of the Dominion. The treasurer's report, by Gordon Condie, showed the financial position of the I.P.A. is in a healthy condition.

Sunday Afternoon Session

L. P. Tremblay, Montreal, introduced City Councillor Marcel Verville, who extended a welcome in English and French on behalf of the Mayor. Mark Turner and Bruno Lacerte, Montreal, acknowledged the welcome.

Subjects discussed on the educational program included topics of pertinent interest under present day operating conditions as well as the outlook for post-war business opportunities.

The educational program included papers on the "Installation and Care of Seals" by Edward Wahl, Rotary Seal Co., Chicago; "Design and Maintenance of Farm and Home Freezers" (printed on page 56) by

I. P. A. Officers 1945-1946

President	William Sneath, Toronto
1st Vice-president	C. E. Pigeon, Montreal
2nd Vice-president	A. Pike, St. John, N. B.
Secretary	E. G. McCracken, Toronto
Treasurer	Gordon Condie, Toronto
Sergeant-at-Arms	J. Dowling, Calgary

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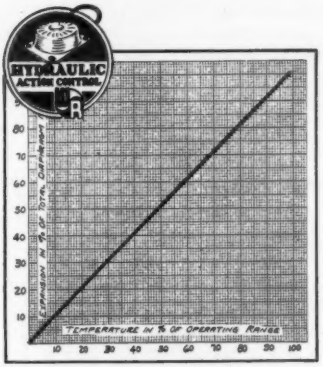
Quebec—J. D. Ross, L. P. Tremblay, Montreal.
Calgary—H. R. Dickinson, C. F. Kloepfer.
New Brunswick—A. LaFlamme, St. John; G. W. Larlee, Edmundston.
Ontario—O. B. Frayne, D. Fowler, Toronto.
Ottawa—W. Podd, H. Arthur.

DIAPHRAGM MOTION UNIFORM

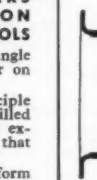
★ PER DEGREE OF TEMPERATURE CHANGE



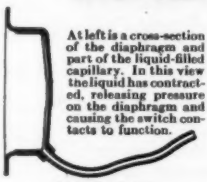
Notice, in the diagram at the left, how the expansion of the Hydraulic-Action diaphragm actually draws a straight line across the chart. This is because the force exerted by expansion or contraction under heat or cold is always *uniform*, and always predictable. That's another reason why White-Rodgers controls are easier to install and free of trouble.

8 EXCLUSIVE FEATURES OF WHITE-RODGERS HYDRAULIC-ACTION TEMPERATURE CONTROLS

1. May be mounted at any angle or position, above, below or on level with control point.
2. Hydraulic-Action principle incorporating solid-liquid-filled bulb and capillary provides expansion force comparable to that of a metal bar.
★3. Diaphragm motion uniform per degree of temperature change.
4. Power of solid-liquid charge permits unusually sturdy switch construction resulting in positive contact closure.
5. Heavier, longer-wearing parts are possible because of unlimited power.
6. Dials are evenly and accurately calibrated over their entire range because of straight-line expansion.
7. Controls with remote bulb and capillary are not sensitive to change in room temperature. Accuracy of control is not affected by temperature changes in surrounding area.
8. Not affected by atmospheric pressure. Works accurately at sea level or in the stratosphere without compensation or adjustment.



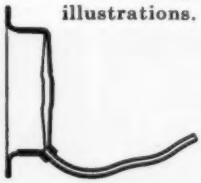
HERE'S HOW HYDRAULIC-ACTION GIVES *UNIFORM* EXPANSION



At left is a cross-section of the diaphragm and part of the liquid-filled capillary. In this view the liquid has contracted, releasing pressure on the diaphragm and causing the switch contacts to function.

CONTRACTED

The solid-liquid charge of Hydraulic-Action provides uniform expansion and *uniform* motion of the diaphragm, as shown in the accompanying illustrations.



In this cross-sectional view, the liquid charge of the capillary has expanded with a rise in temperature. The positive force of this hydraulic action forces the diaphragm outward and causes the switch contacts to function.

EXPANDED

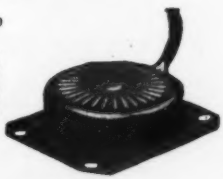


Illustration of the White-Rodgers diaphragm body, the actuating element of every White Rodgers temperature control. It is so designed as to exert FULL pressure at the point of contact with the switch mechanism.

WHITE-RODGERS ELECTRIC CO.

1203D CASS AVENUE ST. LOUIS 6, MISSOURI

Controls for Refrigeration • Heating • Air-Conditioning

C. W. Stoner, Ben Hur Mfg. Co., Milwaukee, Wisc.; "Design and Maintenance of Locker Storages" by R. H. Lock, J. H. Lock & Sons, Ltd., Toronto, and "The Application, Installation and Servicing of Blower Coils" by C. G. Heilig, Air Coils Mfg. Co., Oakville, Ont.

Wm. Sneath, Toronto, Canada
President, Interprovincial Association

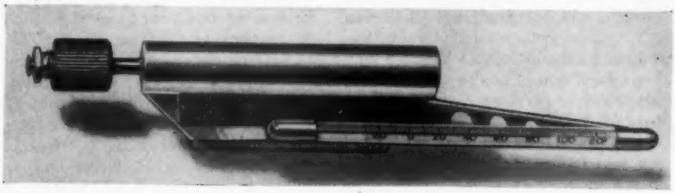
Highlighting the conference was the "Information Please" period which has become an "institution" in I.P.A. meetings. Conducted by Harry Parish, Editor, Canadian Refrigeration Journal, the speakers acting as a "Board of Experts" answered questions on the subjects they have discussed.

Monday Morning Session

W. D. Jordan, Liquid Carbonic Co., Chicago, opened the second day of the conference with an illustrated talk on the "Copelamatic Accessible Hermetic Compressor." An interesting sidelight in conjunction with Mr. Jordan's talk was the disassembly of the compressor by Harry Thompson, president of the Copeland Co.

Wm. Marshall, Toronto, Canada
Chairman, Board of Directors
Interprovincial Association

I.P.A. Officers: Front Row, E. G. McCracken, Sec'y; A. Pike, 2nd Vice-pres.; Wm. Sneath, President; C. E. Pigeon, 1st Vice-pres.; G. Condre, Treas. Rear, O. B. Frayne, Director; Wm. Marshall, Past president and chairman Board of Directors; Directors W. Podd, A. La Flamme and G. Larlee.



$19.50

NOW—MORE THAN EVER

YOU NEED A POCKET SIZE

THERMOSTATIC CONTROL TESTER

Features—

1—Indicates Quickly Cut-In and Cut-Out Temperature

2—Does Not Require Removal of Control from Cabinet

3—Shows Customer Defective Control

4—Clinches Sale for New Controls

5—Scientifically Designed for Easy Operation

6—Excellent Shop Tool for Adjusting Controls

7—Complete with Pocket Case, Instructions and Bulb Adaptor—Ready for Use. Fully Guaranteed. Designed to Save Serviceman's Time by Showing Up Defective Controls. Every Serviceman Needs One. Sell Two Controls and Earn Back Purchase Price.

Immediate Delivery

THERMOSTATIC CONTROL TESTER

Model A100—$19.50

Manufactured by

AIRCRAFT SERVICE COMPANY

1007 Forbes St., Pittsburgh 19, Pa.

JOBBER INQUIRIES INVITED

"Progress of Service from 1920-1945" by Paul Reed, manager, Refrigeration Division, Perfex Corp'n, and International Chairman R.S.E.S. Wartime Educational Committee, provided some early historical data as well as humorous experiences in the pioneer days of domestic electric refrigeration. This paper appears on page 62.

Lt. Col. J. P. Sauve, M.L.A., for Two Mountains, recently returned from overseas, welcomed the visitors on behalf of Premier Maurice Duplessis and stressed the importance of harmony and a "home entente" among Canadians.

Gordon Roe, Toronto, responded for the I.P.A.

Monday Afternoon Session

C. Lowe, Ottawa, Administrator of Capital Equipment and Electrical Products, Wartime Prices and Trade Board, emphasized the importance of maintaining existing equipment this year in view of the prospects of further restrictions on the manufacture of equipment and parts. He pointed out that Canada has only one hundred domestic electric refrigerators in her stockpile to be rationed for the most essential requirements.

"Complete Survey of the Domestic Refrigerator Field" by H. T. McDermott, International Secretary R.S.E.S., provided a preview of the production, distribution and market of the new domestic refrigerator to be manufactured after "V" day.

Concluding the educational program, "Information Please" provided an opportunity for the audience to again quiz the "experts."

The annual dinner-dance, sponsored by Mt. Royal Chapter, was held in the Normandie room of the Mt. Royal Hotel with a record attendance.

Home and Farm Freezers[1]

By C. W. Stoner[2]

AS REFRIGERATION engineers, we may derive satisfaction from the knowledge that we are performing a most important service for the betterment of humanity and for our common cause of winning the war. Our contribution deals directly with the health of people and the economy of perishable foods.

The home and farm freezer promises to be the greatest boon to better and more economical living since the advent of the domestic refrigerator.

Market Outlook for Freezers

All developments to date point to a tremendous market for home and farm freezers, a market that has been variously estimated at from 200,000 to 2,000,000 units per year. This wide variation in estimates of the market for frozen food cabinets is partially the result of production curtailment and wartime restrictions. The home and farm freezer industry was in its infancy before the war, and it appears that the demand that has grown during the war will be further accelerated in the period immediately following the war. Its close association with food, one of the greatest of all industries, gives promise of a tremendous market.

The ground work for customer acceptance of frozen food cabinets was laid prior to and during the war by associated industries such as the domestic refrigerator, the locker plant and the frozen food packers and distributors.

It is estimated that twenty million domestic refrigerators are in use and that 5,800 locker plants are now serving nearly two million families.

War Accelerates Frozen Food

The war has greatly accelerated frozen food production facilities and estimates indicate an immediate need for 50,000 frozen food dispensing cabinets or retailers' display cabinets. New developments in frozen food transportation and distribution are planned.

All these associated industries may be credited with laying much of the ground work for the customer acceptance that exists today, and this market appears so lucrative that over 150 manufacturers have announced that they intend to build low temperature cabinets after the war.

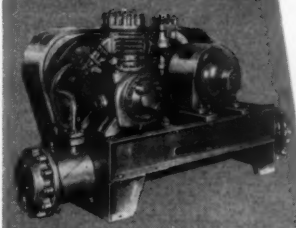
---

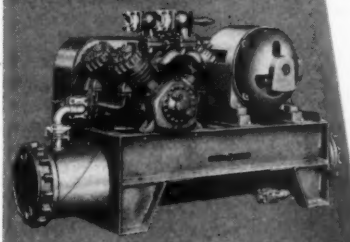
[1]Presented at 6th Annual I.P.A. Conference, Montreal.

[2]Refrigeration Engineer, Ben Hur Mfg. Co., Milwaukee, Wisc.

When you're up against a tough one...

TURN TO





CONDENSING UNITS

RIGHT now, you can get G-E Condensing Units—in sizes ranging from 1/6 to 125 hp.—for all essential applications. And you can *recommend* G-E Condensing Units, with full confidence, for the *toughest* job. The G-E name wins ready acceptance from your customers ... and the units perform with the high efficiency and complete reliability vital in refrigeration applications.

Economy, dependability, long service life—these are outstanding features for which G-E equipment has long been famous. But there's a still further advantage. Rating for rating, G-E units *occupy less space* than most other makes. In replacement jobs, that means you can frequently install a higher capacity unit in the same area, providing additional safeguards against costly breakdowns. In new installations, the compactness of G-E equipment conserves valuable storage or sales space.

Get the full facts now on this complete line of condensing units. Write *General Electric Company, Air Conditioning and Commercial Refrigeration Divisions, Section 57-4, Bloomfield, New Jersey.*

BUY... and hold ... WAR BONDS

GENERAL ELECTRIC

Tune in: "The G-E HOUSE PARTY," every afternoon Monday through Friday, 4 p. m., E W T, C B S ... "The G-E ALL-GIRL ORCHESTRA," Sundays, 10 p. m., E W T, N B C ... "THE WORLD TODAY" News, Monday through Friday, 6:45 p. m., E W T, C B S

The Future of the Industry

The industry growth rate depends on the efficient and far-sighted operations of its inter-dependent divisions. High quality and performance standards are obligations of the manufacturer—intelligent selling and well-planned placement are responsibilities of dealers and distributors. Well informed service engineers will assure efficient and uninterrupted freezer operation. Food processors and distributors must produce and market quality foods. Finally, attractive pricing and customer education in respect to the efficient use of freezer *are* in varying degrees joint obligations of *all* the foregoing divisions.

Freezer Design

Advertisers have succeeded in stimulating public interest by publishing artists' dreams of the farm and home freeer of tomorrow. Manufacturers will strive for acceptable appearance, but are primarily concerned with practicability. Shortages and restrictions have accelerated interest in freeing equipment to which consumers were vaguely introduced during the two years prior to the war, but the consumer by virtue of his sketchy acquaintance with the equipment—sketchy to the point of not even knowing his space requirements—is hardly ready to intelligently dictate design and appearance standards.

It is probable that basic design will approximate prewar models, the majority of which were rectangular, top-opening, chest types along the lines of ice cream holding cabinets.

The structural simplicity of the top-opening type permits favorable production costs. Cold air spillage is negligible when the cabinet is opened, resulting in improved operating efficiency and less frosting of interior surfaces. Top opening cabinets frost most heavily near the top, thereby reducing defrosting difficulties and frequency.

Accessibility of chest type cabinets offers some disadvantages which have largely been overcome in smaller capacity cabinets by designing for shallow reach-in depth, and in larger capacity cabinets, by shelving and partitioning.

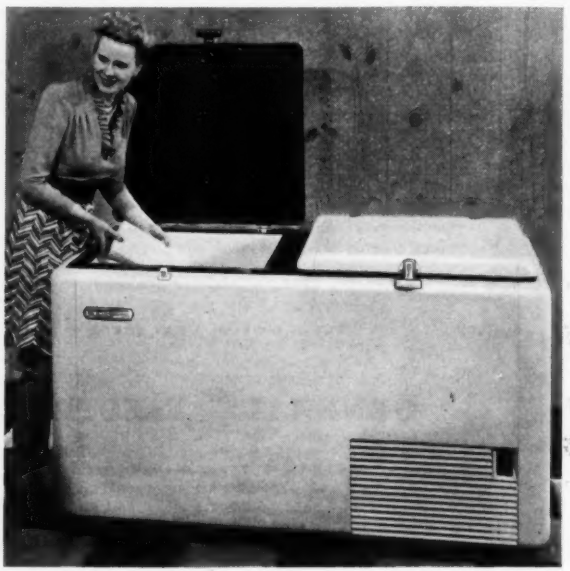
The infrequent opening of freezer cabinets as compared to conventional refrigerators further lessens the importance of the accessibility factor.

Many users of chest type home freezers have found that planned arrangement and marking of packages has solved their problem of locating wanted items.

Outward appearance of postwar freezers will be different, depending on whether the condensing unit is mounted under a portion of the cabinet or externally. It appears the trend may be toward under cabinet mounting to provide more space per given length. Outward appearance of under mounted cabinets will be largely governed by condensing unit ventilation requirements and how these requirements can be combined with artists' conception of exterior design.

Interior cabinet appearance will generally depend on the design of the low side of the refrigerating system. The trend will probably be toward attractive, smooth interior surfaces with the evaporator coils on the liner.

Cabinets of eight cubic feet or less, will generally have a single compartment for storing frozen foods and these will permit simul-



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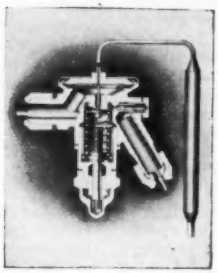

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taneous freezing of small quantities. Larger sizes will usually provide separate freezing compartments.

Freezing compartments will be designed for freezing by air conduction or by combined air conduction and surface contact with horizontal refrigerated surfaces.

Forced air circulation within the freezer compartments will be used in many of the larger capacity models.

The findings of nutrition specialists and customer reaction to the superiority of fast frozen foods compared to the more slowly frozen foods will affect the design trend of home freezers. The trend will probably be toward a freezing compartment separated from the storage compartments to prevent air interchange between compartments and the employment of horizontal surface contact for freezing.

The most popular sizes will probably range from 5 to 18 cubic feet capacity and will be balanced to condensing units ranging from 1/6 to 1/3 hp. Cabinets designed for space capacities greater than 18 cubic feet present dimensional and weight difficulties.

While both the open and hermetically sealed condensing units will be used in the postwar freezer, the trend will be toward the latter.

Rectangular cabinets will probably be favored for their appearance and the fact that they cause the least loss of useable floor space. Small cabinets will normally be placed in kitchens and so their style and finish will be better than larger models which will be located in basements or adjoining buildings.

Farm and home freezers may be equipped with externally mount d temperature indicators so users can readily see how their units are operating.

The need for alarm devices is tempered by the fact that freezers will almost certainly be inspected once each day.

Controls may be mounted to permit exterior temperature adjustments. Temperature controls may be favored over pressure types because replacements are possible without disturbing the refrigerating system. Controls will be provided with a limited temperature range so that it is impossible for users to operate the cabinet at unsafe temperatures by changing adjustments.

Service Troubles

It is unlikely that servicing of home freezers will pose greater problems than today's domestic refrigerator or ice cream holding cabinets. The most serious problems challenging the ingenuity of development engineers today are the problems which are most likely to test the resourcefulness of service engineers later.

Customer use or abuse may, to some extent, cause complaints. Fractional horsepower condensing units have limited heat removal capacity, and excessive freezing loads may cause dissatisfaction unless customers follow manufacturers' loading recommendations as set forth in instruction bulletins.

Home freezers are designed with the greatest care to completely seal all cabinet surfaces against moisture infiltration into the insulating material. If for any reason it becomes necessary for the service engineer to dismantle a cabinet, the greatest precautions must be taken to assure positive resealing. Poor insulation in a *well sealed* cabinet may easily be superior to high quality insulation in a *poorly sealed* cabinet.

Gasket Sealing

Gasket sealing of doors or lids of home freezer cabinets is important, and inspection should always be made when making service calls. Leaky gaskets may cause complaints of excessive running and high power consumption. Leaky door gaskets are usually apparent to the service engineer because of icing directly behind the leak on the liner or breaker strip. Positive gasket sealing reduces the necessity for frequent defrosting.

Operating conditions will determine defrosting frequency, and it is up to the service engineer or the user to decide when defrosting is necessary. Atmospheric conditions, the frequency and duration of cabinet opening, leaky door gaskets and poorly wrapped food are the causes of excessive frosting. Obviously, defrosting during winter months presents the fewest difficulties.

Although manufacturers provide high quality material and workmanship, the forces of corrosion and deterioration are forever at work and it is suggested that service engineers analyze installations to assure the most efficient and favorable operating conditions. Home freezer cabinets in unventilated basements where seepage from lawns is prevalent present complications that may be promptly abated by relocating the equipment or improving the ventilation.

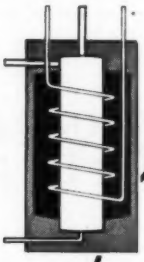
The practice of some users of piling papers or blankets on cabinets should be discouraged because this results in reduced surface temperatures and induces condensation on the finished surfaces, finally causing stains, peeling and corrosion.

Moisture in small quantities inside the refrigerating system in contact with the refrigerant may cause some difficulties unless extreme care has been taken by manufacturers to properly dehydrate the system. Whenever it becomes necessary to open a home freezer system, repairs should be made

THERMOBANK

by

KRAMER



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as quickly as possible. Extreme care should be taken by the service engineer never to leave evaporator tubes open longer than is absolutely necessary. If repairs cannot be made immediately, the tubes should be sealed tightly until repairs are completed. The installation of a new dehydrator in the system is recommended whenever a home freezer system is opened.

Cleanliness during the manufacture and processing of home freezer refrigerating systems is an absolute necessity, and it is essential that strict cleanliness be maintained by service engineers during repairs.

Where repairs are necessary on home freezers, it is strongly recommended that only standard repair parts be used and standard practices be followed. Such practices can best be determined by reference to manufacturers' service manuals. Such unimportant appearing details as quantity of refrigerant charge, amount and type of oil, capillary tube length, bore and source or expansion valve type, size and setting or control type, setting and make will cause great differences in the operating characteristics of home freezer refrigerating systems.

All alert manufacturers are preparing to fulfill their obligations for the production of high quality, efficient and quiet operating home and farm freezers by providing their factories with the most modern testing and processing equipment.

Standard methods of testing and rating home and farm freezer equipment are in the making and will be available to the industry.

Conclusion

The foregoing points up the need for our thoughtful reflection as engineers regarding our coming roles in an industry that will afford us profit in direct proportion to our willingness to further inform ourselves.

Progress of Service From 1920-1945[1]

By Paul Reed [2]

THERE are some among you who can go back with me twenty-five years in the servicing of household and low pressure small commercial equipment that has come to be known as "Electric Refrigeration." To those old-timers, it should be pleasant to reminisce on "way back when," and to you younger ones it should be interesting to compare and contrast refrigeration service then and now. To all of us, it should be instructive to study former conditions in an endeavor to learn what the future may have in store for us. A knowledge of the road over which we have come should be our best preparation for the road ahead.

Beginning of Small Machines

Before examining refrigeration service in early 1920, let us for a moment, take a quick look even farther back, so as to understand something of the background of electric refrigeration, the better that we may understand its evolution. For electric refrigeration is not an invention; it gradually evolved from the design of the larger ice-making machines that preceded it.

Mechanical refrigeration was a product of the nineteenth century. Before that, natural ice, cut in the winter and packed in sawdust, furnished the only means of refrigeration in the summer time or in warm climates and even then, natural ice had only been handled commercially for about a century. The war between the Northern and Southern states cut off the south from most of its ice supply and gave impetus to the growth of artificial ice making in the South. Later, the winter of 1890-91 was so mild, that very little natural ice was cut and the few manufacturers of ice machines were swamped with business. From then on, the growth of the ice and cold storage industry was rapid.

Demand for Small Machine

During this thirty-year period, before 1920, there gradually grew up a demand for a small automatic refrigerating machine for markets and other commercial establishments and these gradually led to a desire for a still smaller automatic machine to be applied to the ice box in the home. This was discouraged by most of the manufacturers of ice machines who recognized the technical difficulties in making a machine that was fully automatic, required no more maintenance than an occasional oiling and defrosting and that had a stuffing-box that would

[1]Presented at 6th Annual I.P.A. Conference, Montreal.

[2]Chairman Wartime Educational Committee, R.S.E.S. and Mgr. Refrigeration Div., Perfex Corp.

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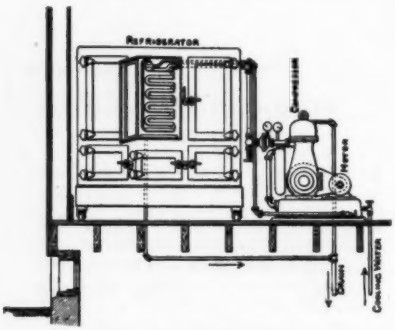
be permanently tight, but they were also influenced by their best customers, the ice companies who had already come to fear the possible inroads of mechanical refrigeration on their business.

So to independent inventors who had some knowledge of the principles of mechanical refrigeration, fell the job of getting together small replicas of the larger machines, mounting at least the compressor, motor and condenser on one base, now known as a condensing unit and using it in connection with a cooling coil, thermostat, and some form of refrigerant flow control valve, usually an automatic expansion valve. Many types were tried and sold locally in the years between 1910 and 1920, and, as is always true of new industries, many companies were formed, some of them being purely promotional stock-selling schemes.

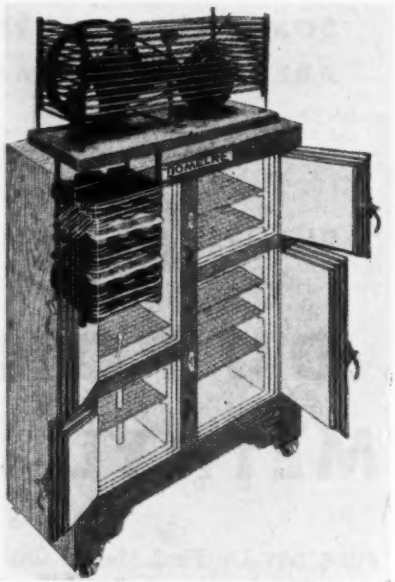
Early Pioneers

Some of the early pioneers were Narco of Wapakoneta, Ohio (later to become Superior), Frostmaker of Chicago, Domelre of Chicago (later to be known as Isko of Detroit), Guardian of Detroit (later to become Frigidaire), and Kelvinator of Detroit. The Isko was probably the first to be reasonably



Narco Unit—about 1916.

dependable and successful that was made and sold in quantities. It was designed by Fred Wolfe of Chicago and named Domelre from the words "Domestic electric refrigerator." He sold his rights in it to a group in Detroit which included H. B. Joy of Packard who renamed it Isko. It had a two-cylinder vertical compressor flat-belt driven by a one-quarter horsepower motor, both mounted on a wood base. Also mounted on this wood base and enclosing the compressor and motor was the air-cooled condenser consisting of a rectangular coil of one-half inch bare copper tubing. The air-cooled condenser contributed to its popularity for most of the units of the 'teen were water-cooled; in fact Isko can be said to be the first successful air-cooled electric machine. It was a big step forward in the evolution of the electric refrigerator.

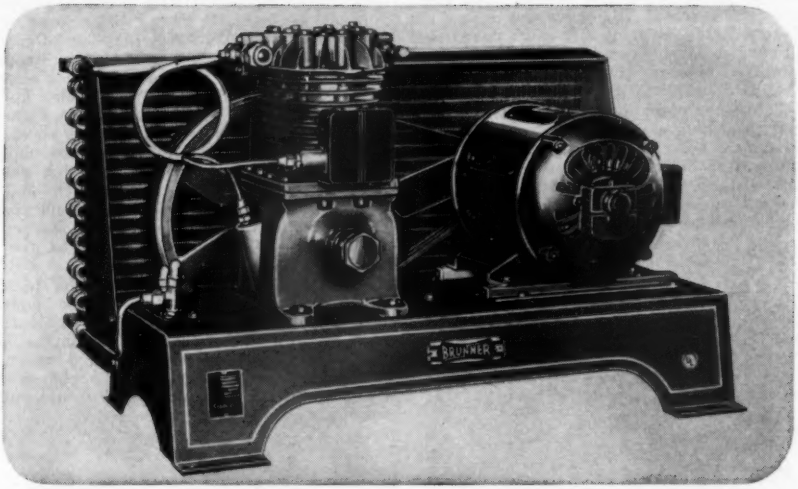


Domelre Unit—about 1914.

The evaporator was hung from the underneath side of the machine base and consisted of a coil of tinned, bare copper tubing with a small space in the lower part for a vessel in which to freeze some ice. The refrigerant, sulphur dioxide, was fed to the evaporator by a weighted diaphragm type automatic expansion valve. Temperature control was by means of a bi-metallic thermostat. Installation consisted in cutting a hole in the top of the ice chamber of a refrigerator and setting the entire unit on the top with the evaporator hanging down in the ice chamber.

The Isko was later sold to A. Y. Gowan of Chicago who went to a herring-bone gear type compressor which gave considerable trouble and probably was one of the factors that caused Isko to be taken off the market. Some of the patents were eventually bought by Frigidaire. Twenty-five years ago, there were many Isko's in use; more perhaps than any other make.

The Guardian was designed and built by the Guaridan Frigerator Company of Detroit headed by A. W. Mellows. In 1918, the company was sold to W. C. Durant, a



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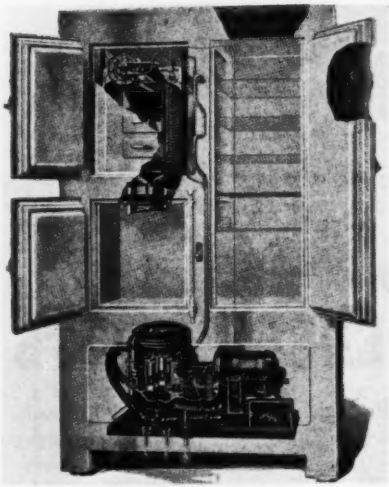
pioneer in the automotive industry and who was instrumental in organizing General Motors. Mellows made about 50 machines, all but two of which were sold complete with cabinets. Durant renamed the machine Frigidaire and sold it to General Motors in 1919 and the plant was moved to Dayton in 1921, becoming a part of Delco-Light. Although the Guardian and its successor Frigidaire were built as complete refrigerators, this was exceptional as most of the early makers offered a machine only, to be installed in the user's ice-box.

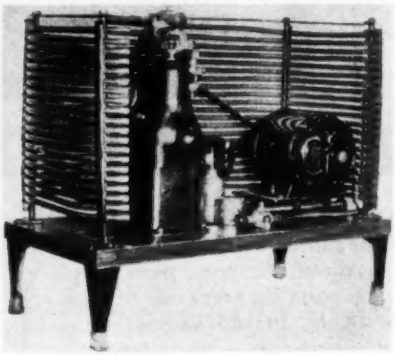


Frigidaire Unit—about 1923.

The 1920 Frigidaire was practically identical to the Guardian except that it had service valves whereas the Guardian did not. It was known as the dome type, with which most of you are familiar as some of them are still in use. It had a water-cooled condenser consisting of a water coil in the dome that enclosed the head and cylinders of a two-cylinder compressor. The compressed SO_2 was discharged directly into the dome, where it came into contact with the cool water coils causing it to condense into a liquid which dropped into a "sump" in the lower part of the dome surrounding the cylinders. The sump acted as a receiver and in it was a high side float that fed SO_2 through an insulated line to the tank evaporator.

The compressor was gear driven by a ¼ hp. Century RI motor, the gear ratio being about 4 to 1. The gears were immersed in a bath of oil. The shaft was sealed by a stuffing-box on which a pressure was maintained by a 150-pound spring. A water valve, actuated by discharge pressure in the dome controlled the flow of water so as to maintain constant discharge pressure. Combined with the water valve was a high pressure cut-out switch. A thermostat was used which consisted of a bulb first under but later submerged in the brine tank of the evaporator and a bellows and switch on the machine. A ¼ inch line ran from the bulb down to a valve on the machine which was connected to the bellows of the switch. This thermostat bulb, line and bellows system was charged with SO_2, the same as in the system. Later 2 ounces of methyl chloride was used to charge the thermostat.

The evaporator consisted of a brine tank with coils fed first by a high-side float built into the sump. This also was a carry-over from the Guardian design. The solution in the tank was calcium chloride and water, specific gravity 1160. Later the high-side float was eliminated and a low-side float put up in the evaporator.



Kelvinator Unit—about 1922.

The 1920 Kelvinator line consisted of one model machine and three sizes of standard tanks. Special tanks were made up for refrigerators with odd shaped ice chambers. The machine was, in appearance, much like the first Isko. The vertical two-cylinder compressor was flat-belted to a ¼ hp. Century RI motor, with an idler pulley on a spring lever attached to the base of the compressor body. The compressor and motor were mounted on a wood base and surrounded by the rectangular condenser of one-half inch bare copper tubing. The evaporator consisted of a coil of copper tubing within a tinned copper tank provided with cores for ice-cube trays. Sulphur dioxide, the refrigerant, was metered into the evaporator through a spring-loaded diaphragm type automatic expansion valve mounted on the tank. The evaporator coil terminated in

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a closely wound coil outside of and on top of the tank and in this coil was placed the bellows type thermostat. Instead of a stuffing-box the compressor had a stationary bellows type seal, which was a great contribution to its success, and a milestone in the evolution of electric refrigeration. Many of you are familiar with this first model as there are a number of them still in use today.

Early Production Schedules

Twenty-five years ago, Kelvinator's production schedule was 25 units a week, rarely attained. Detroit had about 400 installed and Detroit had at least as many Kelvinators as all the rest of the country combined. Selling was through a local dealer with the factory doing the installation and service. There were only a few dealers outside of Detroit. There was a distributor in Louisville whose territory was the entire southern half of the United States. Their quota was 60 units per month which was about the number that they sold during their entire existence of about 8 months.

Frigidaire's production was no greater, probably less, for even in 1922 their production average less than 35 units per week.

Some estimates have been made of the number of electric refrigerators sold and in use in the United States before 1920. One estimate was 7500 and another 10,000; personally, I believe both of these are too high. There probably were not as many service men working regularly on electric refrigeration in the entire United States as there are in this room now. In the summertime, I doubt if one serviceman could keep 100 machines in successful operation.

The first buyers of the new-fangled electric refrigerator, 25 years ago, were not necessarily wealthy people, although the high cost of around $1,000 put them beyond the reach of the average wage earner. The early owners of electric refrigerators were the same people who bought the first cars, the first vacuum cleaners and later, the first radios. They were those with the pioneering spirit, the progressive minded. Prominently represented were the doctors and other professional men; also well-to-do independent business men. The process of their getting an electric refrigerator was somewhat as follows:

Mr. Rose (any similarity to an actual early user in Louisville, Ky., strictly intentional) happened to hear about the new electric ice-box and learned that there was one being shown at the electric company downtown. He finds one in operation there with the tank installed in the ice chamber of a white enamel wooden McCray three-door refrigerator and the machine on the floor nearby. Mr. Rose is interested in how it works, but the only man in the organization who knows is out, but will be glad to call upon Mr. Rose. He would have to anyway for he must examine Mr. Rose's refrigerator to determine the size of tank to be used or if it is in suitable condition to have an electric machine installed in it. The "expert" (it later turns out that he is the installation and serviceman too) calls at Mr. Rose's home the next evening and after examining the refrigerator tells Mr. Rose that it is not suitable for an electric machine. It seems that the refrigerator is quite old, the wood lining is water soaked and would warp and crack and the seams would open when the new colder and drier brine tank is substituted for ice. Besides, it is poorly insulated and would cause excessive operation of the machine. So the refrigeration man advises Mr. Rose to get a new refrigerator. His company doesn't sell them (they don't want to antagonize any of the refrigerator makers) but tells Mr. Rose that there are several good makes such as Bohn, Jewett, Herrick, Leonard, Ligonier, McCray, Seeger and others. He quotes Mr. Rose $675.00 for the machine and tank complete plus about $35 for installation. So Mr. Rose buys a golden oak wood 12 cubic foot refrigerator with a "porcelain-on-steel" liner (except the ice chamber which is galvanized iron) at a cost of $275 and the box and the machine with the necessary tubing, wiring supplies and other paraphernalia are delivered to Mr. Rose's home. Installation is to be made Wednesday morning.

Expert Starts Working

Bright and early Joe the "expert" (he was at the factory for a month and had installed or helped install seven machines before this) and Jim, who is an electrician's helper and who has been lent to Joe three times as a helper and to run the wiring, pile their tools in the 1915 Ford, crank it up (literally, it didn't have a starter) and head for the Rose home. On the way, they stop at a grocery and get 40 pounds of barrel salt at 1c per pound. This is for the brine for the tank.

Upon arrival they unload their tools and take them to the basement. While one uncrates the machine and tank, the other empties the ice refrigerator and they take it to the basement and put the food and ice back in it. It will be dinner time or perhaps bedtime before the electric refrigerator is cold enough for use. And besides, Mrs. Rose very prudently decides to keep the old ice refrigerator just in case the electric one breaks down.

The new refrigerator is set in place and it is found that its drain doesn't line up with the old funnel, so Joe takes the measurements for a new spout extension, which he installs later in order that a drain be still available. The machine is properly placed in the basement and Jim starts the electric

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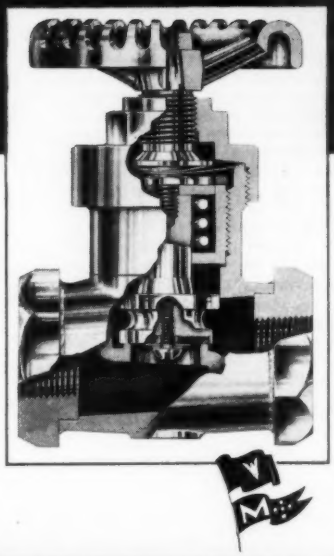

Entirely refrigerated cargo ships speed foodstuffs to our fighting men —all over the world—to freed peoples in every land.

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work. This consists in setting a 30 ampere switch cabinet on the wall nearby, running an electric line from the meter to it and from the switch to the motor and another electric line from the switch up to the basement ceiling juts under the refrigerator where a connection box is placed. From this box a piece of number 14 two-wire lead duplex is run up to the ice chamber to a special receptable into which is plugged the cord from the thermostat.

Joe, in the meantime, gets the really tough job. This consists in getting a hole in the refrigerator for the lead duplex, and the two refrigerant lines, the liquid line of ¼ inch copper tubing and the suction line of ½ inch. For some strange reason, which I have been unable to fathom, the instructions were to go through the bottom of the ice chamber (galvanized iron and wood usually), down through the porcelain-steel liner, and then the insulation and wood of the bottom of the refrigerator. That hole in the bottom of the liner was quite a trick. It had to be about 1⅛ inches in diameter and if the steel was rather thick such as number 16 gauge which was not uncommon, it was very difficult to keep from flaking all the porcelain off of the bottom of the liner for several inches around. And just for variety some manufacturers made the liner of opal glass and others of a heavy casting of vitreous porcelain. They were of fine quality but the wood liners or painted tin ones were much easier on the refrigeration man. It would have been so much easier to just bore a hole through the back of the ice chamber and also it would have made it easier to pull the refrigerator away from the wall, but the rules said to run the tubing and electric connection through the bottom.

Lunch Served by Customer

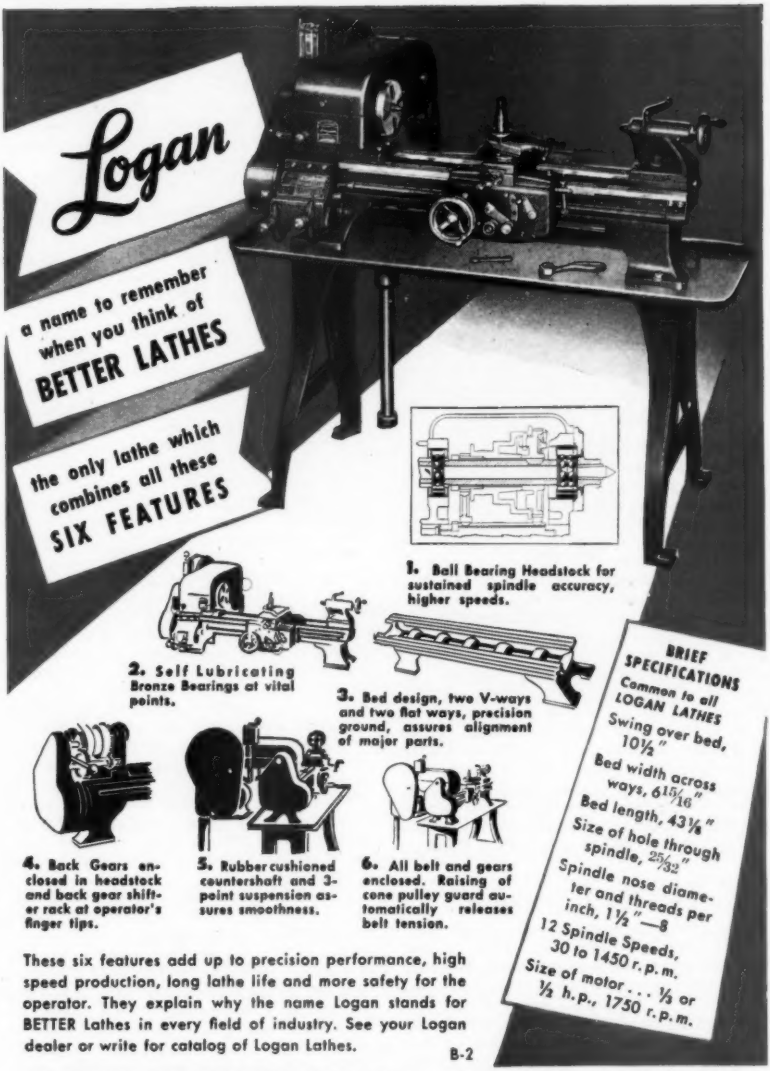
It was about noon before Jim had the holes in the refrigerator and in the floor underneath, and by then he and Joe were ready for sustenance—Mrs. Rose announced that she had a lunch for them (this was not unusual in those days). Right after their lunch, they went back to work, so it was not long before they were running the tubing While Jim made the connections downstairs and ran the lead duplex and set the receptacle upstairs, Joe made a frame on which to place the tank. Wood blocks were often used, and some servicemen even set the tank directly on the ice-rack, but Joe had brought some iron strap such as is used for hanging pipes, and he fashioned a very nice frame from this material. Eventually, the tank was put in place and the tubing connected to it.

Joe's tube cutter was a hack-saw. He sawed the tube as squarely as he could, then put on the flare block backwards, and filed the end of the tube flat against the block so as to get it square. With the block off, he reamed the tube and filed off the burr. It was necessary to saw and file in an awkward position, for the end of the tubing had to be held downward to keep filings out. After filing the end square the inside of the tube was wiped out with a clean cloth moistened in oil. Then came the flare nut. They were called "Michigan nuts" in those days, and they were not forgings and consequently, we frequently were bothered with them splitting, which wasn't so nice considering that sulphur dioxide was about the only refrigerant used in the domestic and small commercial machines at that time. Our flaring block was much like those used now but the flaring punch was not the yoke and screw type. We actually used it as a punch and hammered on the punch to form the flare. One had to be careful not to get the flare too thin entirely nor too thin on one side and too thick on the other. Then too, there was more likelihood of splitting the flare, especially since much of our tubing was not the seamless type and as a rule was not very soft.

And we used to do another thing then that doesn't happen today. I'm almost ashamed to admit it. We used to make a flare and then find that we hadn't put on the flare nut. As if that wasn't bad enough, we sometimes did it twice in succession; then, we were about ready to bite ourselves.

Assembling and Leak-testing

After the tank was in place, the lines run, both refrigerant and electric, and the connections all made, then came pumping a vacuum on the system—that is, all of it except the condenser which held the charge, with the two valves on the condenser closed. The liquid line was connected to the bottom valve, the condenser valve. The top one, the discharge shut-off valve, was a "three-way" valve so that, with the stem in the closed position and with the plug out of its service port and the suction shut-off valve open, but with the compound gauge in its service port, Joe could pump out the air back through the suction line, the evaporator coil, the expansion valve and the liquid line clear to the condenser valve. After he got a low enough vacuum that he could not detect any more air by sound or feel he poured a slight bit of oil in the service port of the discharge shut-off valve and when no bubbles came through this oil, he knew that he had as nearly perfect a vacuum as he could get. By stopping the machine for about one-half hour and again starting it, he further tested for a very small leak and in addition, this gave a good test for the discharge valves. After he had a good vacuum, he put on the high pressure gauge, opened the discharge shut-off valve to the cracked position and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opened the condenser valve until he got a suction pressure of at least 15 or 20 pounds per square inch. Then he tested all joints or any suspected places with a small cloth wetted with 26 per cent. aqua ammonia, which, as you know, shows a white "smoke" when it comes into contact with sulphur dioxide.

Joe found no leaks, so he released the charge and started the machine. In the meantime, Jim had been mixing the brine in a beer jar (those were prohibition days in the states) and the solution was siphoned into the tank. This was done earlier in order to allow the evaporator coil to be tested for leaks, or if it did have a leak to prevent entrance of water into the system when pumping a vacuum.

As I recall, the expansion valve was set for 1 pound per square inch for the small No. 1 tank, 2 for the No. 2 tank, 3 for the No. 3 and a maximum of 4 pounds for the special tanks that were frequently made necessary because of odd sizes or shapes of ice chambers.

Unit Installed and Running

By the time that Mr. Rose got home early from the office, about four, the tank was beginning to get cold, perhaps even frosted. Joe and Jim had cleaned up the mess they had made and filled the ice cube trays with water. Mr. Rose served a drink of bootleg whiskey, dandelion wine or home-brew and, in this convivial atmosphere, Joe gave the Roses instructions on the care and use of this new addition to the fast-growing better-living appliances that were then just starting to be available—the electric washing machine, the ironer, the vacuum cleaner and a host of others. The radio, talking movies and commercial air travel were as yet unknown to the public. Joe and Jim left about 5 P.M. By bedtime, the tank was frosted and perhaps the machine had stopped. Ice had begun to form in the trays, but would not be solid before morning. Soon friends and curious neighbors would drop in, admire it, and exclaim, "What won't they think of next?"

Post-War I Planning

Today, we hear a great deal about post-war and post-war planning. Well, twenty-five years ago today was post-war, although that expression was not used then, and there was very little intelligent large scale post-war planning or at least it was not publicized. It was pretty much a matter of each individual or company doing what seemed best or most expedient as they went along. A great deal of advance planning and preparation is being made now by individuals, companies, associations and politicians, and perhaps we may do better this time. It remains to be seen whether deliberate attempts to guide events and accelerate progress are as effective and as rapid in the long run as what seems the more aimless, cruel and muddling process of letting events shape themselves. We run a good chance of doing better than before, if the politicians do not spoil things as they usually do.

And speaking of politicians, reminds me of what our Hoosier philosopher, Ken Hubbard known as Abe Martin, once said, "Lem Sparks had two boys, one of them was a politician and t'other one warn't no good neither."

Limited Information Available

The crying need of the refrigeration man in those days was information. The only books on refrigeration concerned themselves with large ammonia and carbonic acid machines. The "small" machine to them was anything under twenty-five or fifty tons, and household sizes were totally ignored. There was a lot of good to be had from these books, the underlying theory and principles of refrigeration, calculations of load and other matters common to all sizes and makes, but these things were quite difficult to dig out of a mass of data on ice-making, cold storage and brewery refrigeration and apply to household refrigeration. In December last year, the American Society of Refrigerating Engineers celebrated its 40th anniversary. Some of the charter members and other old timers exchanged reminiscences and all of them brought out that, at the turn of the century what they needed most was information and accurate data; simple data that we now take for granted,—the heat transmission factors of insulating materials, surface factors for evaporators and condensers, thermodynamic characteristics of ammonia, etc. Much of their estimating was "guesstimating" or at best by rule-of-thumb. There were few standards and little dependable data. Trained men were very few. Fifteen years later, we in the low pressure field were in exactly the same fix, but our need was for more mechanical construction and operation information.

Copeland, Universal Cooler and Servel started in the early twenties and brought out manuals. Kelvinator had a service manual, a very good one too, perhaps Frigidaire did also. Servel's was the first information that we got on methyl-chloride. The Freons, of course, came along several years later. But these manuals were about all the published information on "electric refrigeration" there was and they were available only to their dealers or dealers' servicemen.

The first book on our field of refrigeration, at least the first that I saw, was Hull's "Household Refrigeraton," the first edition of which was published in 1924 by Nickerson & Collins Co., who also published the only

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magazine of the refrigeration industry ICE AND REFRIGERATION . . . ASRE put out its Journal every other month but neither of these magazines gave us much in our line. "Electric Refrigeration News" first appeared in 1926 and was enthusiastically welcomed for through it we began to get information on other makes and industry affairs. It was not until June, 1933, that a magazine devoted to the serviceman, our own REFRIGERATION SERVICE ENGINEER also published by Nickerson & Collins Co., came into being.

A Serviceman in Thirty Days!

Getting into refrigeration in 1920 was literally just that. You could make little or no preparation. If by chance you were working for a public utility company, a hardware house or an electric appliance company that started to handle electric refrigeration you might be chosen to be sent to the factory for three or four weeks. There, you were set to tearing down some compressors that had stuck from moisture in the system, or you were allowed to wander around over the factory and examine parts as they were being made and assembled. You spent quite a little time in the final inspection and test room of the completed machine. After a week or so, you were sent out as a helper on an installation and finally, during the last week you went around with the trouble-shooter on service calls and saw what caused complaints and how they were corrected.

At the end of the month, you were sent back home to be the refrigeration expert for your dealer-employer, to inspect the ice-box of a prospect to be sure that it was suitable, to choose the tank size (usually we used the biggest one that we could get in the ice compartment door), to answer questions from the customer that the salesman could not answer, and of course, install and service those jobs you yourself sold and those sold by one of the salesmen.

All needs had to be anticipated some time in advance for practically all material, refrigerant, tubing, fittings, tools, etc., had to be obtained from the factory. Moreover if a question came up for which you did not have the answer and if it was not in the service manual, you had to figure it out yourself; there was no one to ask and nowhere to look it up. This made for self-reliance but it also made a lot of mistakes. It was the old process known as "learning" the hard way." It was hard, not only on us who were learning, but it was also hard on the dealers and customers and the mortality rate on house plants and canary birds was terrific.

Twenty-five years ago, there were no refrigeration supply jobbers and if there had been, their cost of doing business would have been very high and the volume of sales extremely low. The manufacturers of the machines had to furnish the tubing, fittings, refrigerant, oil, tools and cylinders. They had to train the men; there was no pool of refrigeration servicemen from which to draw. Servicemen were made from electricians, plumbers, automobile mechanics or just men who were mechanically minded and had a knack and liking for refrigeration.

As dealer outlets multiplied and as more makes came into being, as books and magazines were published and disseminated varied information, as servicemen changed from one make or one dealer to another and as designs standardized, some men came to be familiar with several makes and thus the independent service operator came into existence. This occurred in the latter part of the twenties and at about the same time and from very much the same causes the refrigeration supply jobber appeared on the scene.

Birth of the Independents

The independents were sometimes former servicemen on makes that had been discontinued. Perhaps you will recall some of these: Absopure, Electrice, Electro-Kold, Holmes, Ice-Maid, Iroquois, Wayne, Welsback, Zerozone and later Majestic, U.S. Hermetic Truscon and a host of others. We now call them orphans. What was more natural than that the serviceman now out of a job but knowing the machine, having the tools and perhaps some spare parts, should be called by the users to service their orphan. The first decade or so after the war saw many companies spring up, build a quantity of machines and die out. Sometimes it was the common cause of poor design; sometimes and more frequently in fact, it was simply lack of good business management. At any rate, the orphans had much to do with the rise of the independent service engineer. At first, most of the major manufacturers were inclined to be a bit fearful of the independent service men and of the jobbers. These did not fit into the distribution set-up of the manufacturers, but most important, the manufacturers were afraid that the service rendered on their product would be poor and that the reputation and prestige of their product would suffer. This feeling was quite understandable and their fears were not without justification. All of us know that some men have started working for themselves without sufficient experience and have torn into equipment to find out how it worked and without a sufficient knowledge of how it should be done. Their lack of knowledge has in some instances been due to the reluctance of the manufacturer to give out information

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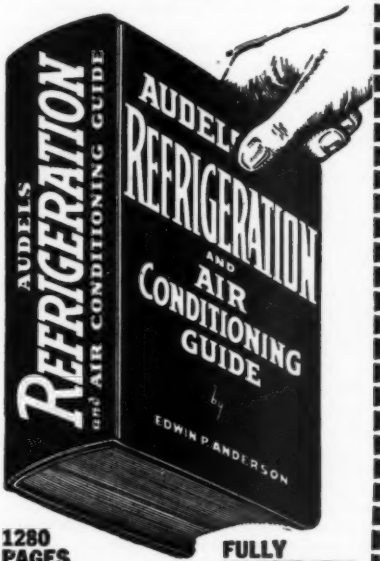

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beyond his own organization or to sell parts other than to his franchised dealers. Although justified in some instances, due to the highly specialized nature of the equipment, this policy has tended to promote the manufacture of non-standard parts and the substitution of other makes and designs for some of the sub-assemblies. The entire industry would benefit by a little better acquaintance with one another. Most people turn out to be pretty fine fellows after you meet them on terms of mutual respect and get to know them.

Responsibilities of Service Men

Today, the servicemen occupies a place of responsibility in the industry along with the manufacturer, the jobber and dealer. In the face of a terriffic reduction in number of servicemen, shortage of materials and parts, government regulations and transportation troubles, he has kept, according to a recent estimate, 98 per cent of the refrigeration equipment in reasonably effective operation. This is good as compared with some of the other repair trades, such as radio repair which has kept only 85 per cent of the sets in operation. His reputation has come through pretty clean although not entirely untarnished; there have been some cases of overcharging and slighting the job, and this is a matter that should have our attention. Membership in the Refrigeration Service Engineers Society is a privelege and its reputation and that of all members must be zealously guarded. The type of man who cooperates with others, who is willing to talk over his problems in chapter meetings, who wants to learn more about his business and who is willing to give some of his time to society activity and help others, is not the racketeer type, who gets away with as much as he can and grabs as much as he can. This type isn't interested in cooperation with his fellows, in acquiring more knowledge, improving his proficiency nor helping others; he is willing to sacrifice reputation and his future business to an extra dollar now. Let us try to guide such operators away from these bad practices, but to maintain the prestige and reputation of the society we must be prepared, if need be, to deny membership to those who take unfair advantage of their customers. We have a duty to the public but fortunately fulfillment of that duty is to our self-interest and our devotion to that duy will be to our business advantage.

We have another duty, a duty to the veterans who have fought our battles while we stayed at home and did our bit in a useful but far more comfortable and safer way. We must do what we can to give them help; they deserve it. If you have a former employee in the service, perhaps you can enlarge your business to give him his place back. He has been gone months, perhaps years, in a different world. He has lost touch with the refrigeration business. Design your chapter programs around his needs; you will find that they will prove to be your needs too. There are thousands of young men who went from school into service. They especially need your help and advice. The refrigeration business is due for great expansion. There will be room and jobs of varied sorts for all of us in it after the war.

The Highway to Success

Many of you are planning to enlarge your service business; many are planning to include a merchandising program, that is, to become dealers. If you will follow sound business principles and treat your customers right, you can make a success. Most of the rest is just plain hard work and a little common sense. You have a great opportunity, one that comes rarely. You are now about the only direct contact with the user and the potential customer that the industry has had for several years. You know who needs a new machine, about how long his present one can last, what type he wants, and what his plans for expansion are. You have a fair idea of how much he can spend or will spend for new equipment, and if you take his old equipment in on trade, what will have to be done to it and at what cost, and for about how much and to whom you can resell it. The manufacturers are making expensive surveys to find out those things that collectively the service engineers know.

But before you decide to get into the selling end of this business, ask yourself, "What do I know about being a dealer?" "Can I give the customer the service to which he is entitled?" "Am I in a position to fulfill my guarantees to the customer?" "Am I going to stay in business or drop out and go to work for someone else?" If you cannot honestly answer those questions satisfactorily, then stay out of the selling end and stick to the service business. Perhaps you may make a little less money but have more fun in doing the work that you like best and for which you are best fitted.

Success Depends Upon Knowledge

The prime function of a professional society is the advancement of its members, and it follows that one of, if not the most important service it renders is its educational activity. We grow only so long as we are adding to our knowledge; when we stop learning we stop growing. Our growth in size has been extremely gratifying. Let us be sure that our growth in knowledge and usefulness keeps pace with our growth in size. We must never be content with what we know, for at best, we know so pitifully little, nor with what we have done, for so much remains to be done.

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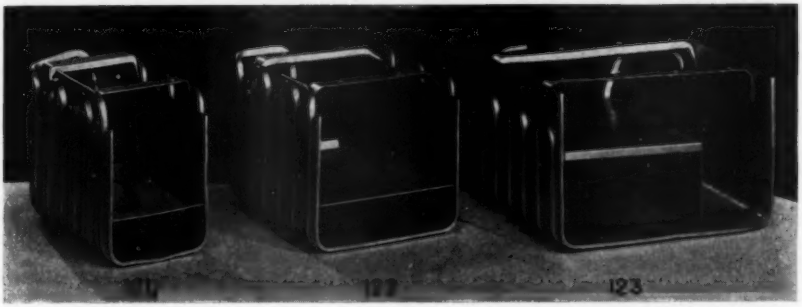

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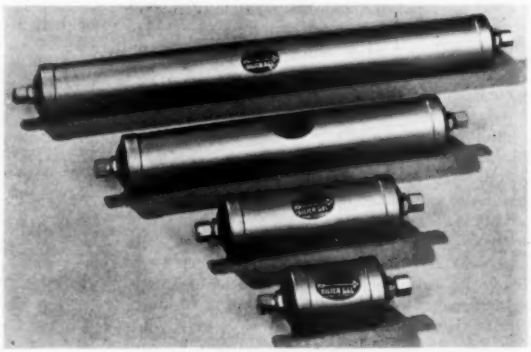

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KEY CITY CHAPTER GETS CHARTER

HAVING completed all the preliminary chapter formation work, 15 charter members and guests of Key City chapter, Dubuque, Ia., met for the charter presentation ceremony at Ranier's Orchestra Hall, March 6.

The presentation was conducted by R. L. Hendrickson, from the office of H. T. McDermott, International Secretary. After formally presenting the charter to Theodore H. Glass, chapter President, Mr. Hendrickson called the names of each charter member and had them come to the platform where he individually greeted them and delivered their certificates and membership cards.

Planning his itinerary to be at the meeting, Herman Goldberg presented a very comprehensive picture of the advantages of being a member of the R.S.E.S. both now and after the war when refrigeration equipment and supplies are again available.

The program included Fay Chapman, City Milk Inspector, William Galloway, Director of Classes at Iowa Engineering college, and E. Norton, City Electrical Inspector. Mr. Chapman pointed out the need and market for milk coolers in the Dubuque area. He indicated potential sales of coolers could easily reach 50 units if the refrigeration companies would make an effort to sell the dairy men on proper refrigeration for liquid milk and other dairy products.

Mr. Galloway briefed several pertinent topics covered in the meeting and pointed out the two basic points in selling. He stated that selling depends on "ego" or "fear," either of which could be used to sell milk coolers but the stronger sales story, as he saw it, would be based on fear of high bacteria count in milk which was not properly refrigerated.

Mr. Norton prefaced his remarks by congratulating the members on forming the Key City Chapter. He expressed the willingness of his office to work with the group or individual on any electrical construction required when installing refrigeration. He impressed those present with the limitations and scarcity of materials but in the face of such odds pride of workmanship should dictate proper installation without inspection from this group whose slogan is "we do it right."

Fourteen of the fifteen charter members were present; Carl H. Waechter being detained on a "service call" from Uncle Sam requiring his services in the armed forces.

R.S.E.S. Chapter Notes

MAGNOLIA STATE CHAPTER

Jackson, Miss., Jan. 24—The Chapter met for a regularly scheduled meeting at Odom Refrigeration Supply Company at 401 Broad Street. An interesting discussion of electric motors by those present constituted the educational program for the evening.

The following members of this Chapter attained passing grades on the Certificate Membership Test conducted by Mr. Boyd Evans of Memphis last October: Charles W. Bowron, Francis B. Frazee, Chester B. Gardner, B. L. Palmer, and W. Q. Smith.

Feb. 28—A regular meeting was held at Brummett & Company, 910 E. Fortification Street. Mr. Charles Bowron called a meeting of the code committee to be held March 7th at Brummett & Company. After general discussion, plans for a social meeting were left in the hands of the entertainment committee.

Mr. Shafer then entertained and enlightened the members with a Frigidaire film on service methods.

TOLEDO CHAPTER

Toledo, Ohio, Feb. 14—The meeting was held at Redman's Hall and attended by 29 members. Two fine films "On the Air" and "Kill or Be Killed" were presented by Westinghouse Electric Mfg. Co.

The certificate examination results were discussed to some extent, mostly on air conditioning questions with more to come at the next meeting. The prompt attendance prize was won by Earl Turner. Four new members were admitted to membership at this meeting.

March 14—The Chapter held its meeting at Redman's Hall with 30 members present. The Certificates of Proficiency were issued to those at this meeting who had previously passed the Certificate Examination; thus becoming Certificate members.

An initiation was held following the meeting for the new members recently taken in the Society. Coffee and doughnuts were served after the initiation.

SAN DIEGO CHAPTER

San Diego, Calif., Feb. 8—The meeting was held in the meeting room of the Anderson Building with twenty members, and eight guests, from the U. S. Navy, present. President French presided. Applications for two new members were approved and two more were read and turned over to the membership committee for examination and report.

The monthly committees in charge of education and entertainment were chosen by lot. Each committee consists of four members

with alternates in case of necessity. They will follow a definite program of monthly topics which President French has outlined as follows: March—Refrigeration Theory; April — Compressors; May — Condensers; June—Coils; July—Valves; August—Controls; September—Refrigerants; October—Low Temperature Systems; November—Two Stage Condensing Units; December—Insulation; January—Review of Year's Subjects.

Mr. N. E. McDougal was selected chairman of the Chapter committee to work with Mr. C. L. Olin and the Service Improvements Advisory Committee. A committee was selected to work with authorities who are now considering a refrigeration code and ordinance for the city of San Diego. This also has a direct tie-in with the plans of the state and city school authorities who are now planing a full-scale refrigeration training course here.

March 8—The Chapter meeting was held in the regular meeting rooms of the Anderson Building. Applications for three new members were approved and three others were read and turned over to the Membership Committee for investigation and report.

A short business session followed and the meeting was turned over to the evening's Educational Committee. Mr. Ray Moran, Chairman, gave an interesting talk on refrigeration theory. An open discussion followed and the members then adjourned to the Anderson shop where several interesting experiments were performed.

MILE HIGH CHAPTER

Denver, Colo., March 12—The meeting was called to order at 8:15 P.M. by Chas. Land, president. A roll call by the secretary showed 18 members and one visitor present. Applications of two men, Mr. Wilson W. Heath and Roy C. Maxfield, were received and both were unanimously voted into the Mile High Chapter.

Lyle Smith, of the sick committee, reported that Elsa M. White, a former member, had passed away in December. Dean Haggardt made a suggestion that all members of the Mile High Chapter in Denver list their names in the telephone directory, classified section, under a heading of "Members of the Mile High Chapter, Refrigeration Service Engineers Society," showing the emblem of the Society. Each member then could tie his concern's ad into this ad by also displaying the emblem. This suggestion brought up much discussion, and it was finally voted to appoint Mr. Haggardt to contact all members in Denver and get their reaction to such a plan. He also was to contact the Telephone Company regarding it, and was to report back to the president and secretary.

LOOK AHEAD. Can you see ANYTHING small about refrigeration for the future? Doesn't EVERY phase and branch promise something BIG for men who are themselves BIG enough to grasp the opportunities? . . .

THE U.E.I. PROGRAM OF BALANCED TRAINING (home study plus intensive shop practice) is designed for men who want to grow BIGGER in refrigeration and air conditioning knowledge and skill. It's for men either in or wanting to get into refrigeration. It is the program of training which is identified with the success of many a man who is filling some pretty big shoes in the industry today. It's the training program which for over 18 years has helped small men grow big in refrigeration. . . . If you're planning to get somewhere in this field, use the coupon below as a starter.

FREE FACTS

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1314 W. Belden Ave.

Dept. 45, Chicago 14, Ill.

Please give me more information about Refrigeration and Air Conditioning Training, as promised in your "Refrigeration Service Engineer" April, 1945 advertisement.

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ADDRESS .....

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VALLEY CHAPTER

Saginaw, Mich., March 15—At this meeting of the R.S.E.S., Ed. Campbell of the Wolverine Tube Company gave the members a very interesting talk on the history of copper, the forming of various copper and copper alloys. He also showed samples of different pieces of copper and brass which the Wolverine Tube Comany make.

The meeting was followed by a buffet lunch held at the Home Dairy Company in Saginaw.

ILLINOIS VALLEY CHAPTER

Peoria, Ill., Feb. 9—The meeting was held in the Jefferson Hotel. Phil Hedrick, Chief Application Engineer, Universal Cooler Corp., was the guest speaker. He discussed post-war refrigeration, then covered Universal Cooler equipment as presented in their recent publication, "Refrigeration Is Our Business." Some interesting information was brought out on the home and farm freezers as well as what might be expected in the low temperature field after the war. A working model of Universal's hermetic unit was also presented.

Following the meeting, those present met their wives and had supper in the dining room.

DAYTON CHAPTER

Dayton, Ohio, Feb. 8—The meeting was held at Allied Parts. One new member, John Stevens, was accepted. For the educational program, Mr. Denny introduced Mr. Schriber of the Williams Company, Cincinnati, who outlined methods of calculating the size of the equipment needed on different type installations.

March 8—The educational feature of the evening was given by Mr. Stewart, Kelvinator Sales Co., Cincinnati. He discussed the troubles and their remedies peculiar to Kelvinator equipment.

ROCKFORD CHAPTER

Rockford, Ill., March 3—Eleven members and three guests attended the meeting to hear Bob Anderson of Imperial Brass discuss the problems of the manufacturers that directly reflect to the service man. The theme of the discussion was "Why We Are Not Getting as Much Material as We Think We Should." Those present all appreciated the information given by Mr. Anderson. Gustave A. Larson substantiated Mr. Anderson's talk by enumerating the many items he has on order to maintain his inventory and fill customer orders.

Refreshments were served at the close of the meeting with the compliment of the Gustave A. Larson Company.

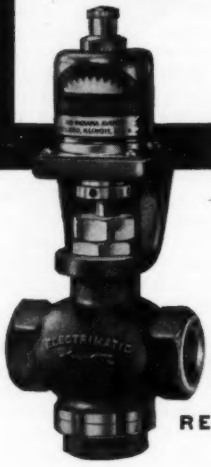
TWIN CITIES CHAPTER

St. Paul, Minn., March 6—President Frank called the meeting to order in the Andrews Hotel. A favorable report from the membership committee on fifteen applications was submitted and the members voted to accept twelve active and three junior members.

The secretary was authorized to print copies of the Chapter Constitution and By-Laws for distribution to all members and new members accepted. Following the business meeting, Mr. Martelle, of United Motors Service, Inc., gave a very interesting talk on electric motor problems covering maintenance and repairs.

Group attending lecture on "Frozen Foods of the Future," sponsored by Youngstown Chapter, R.S.E.S. Youngstown, Ohio., Feb. 21. A report of this meeting appeared in the March issue.

EFFICIENT... ECONOMICAL



TYPE **WP** PRESSURE ACTUATED REGULATING VALVES

Individually tested for efficient, economical operation. WP regulating valves may be mounted in any position and will give lasting, trouble-free performance. Brass body, two ply power bellows and corrosion resistant materials for all internal parts. They are designed not only to start and stop the flow of water but also to feed the economic amount of cooling water to secure the proper condensing pressure without waste. The water flow increases and decreases with the rise and fall of actuating pressure.

WP regulating valves are available in ⅜", ½" and ¾" FPT sizes and other valves of other types are available in sizes ranging from ⅜" to 2" FPT.

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The way to spell PROFIT

● Just depend on Aerovox replacement capacitors for servicing wornout motor capacitors. 22 universal numbers take care of practically ALL standard capacitor motors. Aerovox Conversion Chart helps you select the right type. Quick action—satisfaction—PROFIT. ● Ask your jobber for them. Or write us.

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KANSAS CITY CHAPTER

Kansas City, Mo., March 7—The Chapter meeting was called to order by President Ferguson at the Hotel Bellerive. In addition to the members attending, eight recent members were initiated and accepted the oath. Applications for three junior and one active member were accepted.

The educational feature was conducted by G. E. Tribble, member, who gave a talk on the design, construction, and use of Sterilamps. Those in attendance gained much first hand knowledge.

The following Saturday night Kansas City Chapter held their tenth annual dinner-dance at the Brookside Hotel. Those in attendance enjoyed a wonderful dinner after which tribute was paid to Mrs. Lambert, Messrs. Brown, Allen Farthing, Hoover, Lambert, Lichtenauer, and Sullivan, who are in the armed forces. Chapter officers were introduced and President Ferguson outlined the objects of the R.S.E.S. for the benefit of guests present. Mr. Ferguson pointed out that of the ten who met ten years ago to form the Chapter, seven are still members.

Ladies Auxiliary

ILLINOIS VALLEY AUXILIARY

Peoria, Ill., Feb. 9—At this meeting, the ladies decided to give five dollars to the March of Dimes. Valentine gifts were exchanged and all enjoyed playing Bunco until time to join their husbands in the Jefferson Hotel dining room for supper.

TWIN CITIES AUXILIARY

Minneapolis, Minn., March 6—Ten members and guests met for the regular meeting. After caring for the regular business, all enjoyed the card party immediately following.

MISSOURI VALLEY AUXILIARY

Omaha, Nebr., Jan. 25—The meeting was held at the home of Mrs. Flohr. Final reports for the past year were read and approved. The following officers were elected: Mrs. C. J. Doyle, *President;* Mrs. G. M. Buckman, *Vice-President;* Mrs. A. W. Diets, *Secretary-Treasurer;* Mrs. R. V. Meleis, *Sergeant-at-Arms.* Those present decided to hold only one meeting per month instead of the customary two per month.

KANSAS CITY AUXILIARY

Kansas City, Mo., March 7—At this meeting the regular business consisted of appointing Mrs. Record as membership chairman, a report on the recent raffle, and the reading and adopting of a constitution. After the business meeting, refreshments of Jello and cake made by Mrs. L. A. Anderson were served.

PHILCO PLANS WIDE EXPANSION OF SERVICE ORGANIZATION

FORMATION of Philco Service, a worldwide organization of appliance servicemen to establish new high standards in the profession, has been announced by Robert F. Herr, vice president in charge of service for Philco Corporation. A membership of 25,000 appliance servicemen qualified to repair all types of radio receivers, refrigerators and air conditioners is expected by the organization within the next two years.

"Philco Service is the natural growth of ten years' experience with Radio Manufacturers' Service, which Philco organized in 1934 and which is generally recognized as the most outstanding group of its kind in the world," Mr. Herr said in explaining the purpose of the new organization. "Thousands of members of RMS are today serving the Army and Navy as radar and electronic technicians. All these and many new appliance servicemen are expected to join Philco service, which will help them become even better technicians and businessmen. They should do an increased volume of work through Philco Service, and the users of Philco products will be benefited by their greater knowledge and ability."

Membership in Philco Service is open to individual servicemen, dealers' servicemen, and dealer organizations both in the United States and other countries which have and maintain facilities adequate to carry on high quality work. Members will be informed as to the latest technical developments and will be instructed in maintenance and repair work. One of the features of the program will be a Standard Labor Charge schedule to insure the public of fair prices on its repair work and at the same time assure the serviceman that he receives the proper amount of compensation.

An important phase of the program is the personal technical training and schooling from the local Philco Service Headquarters —the Philco distributor. Members will be furnished with credentials to show they are fully qualified to render guaranteed service on Philco and other products.

S S S

Howard Nowka
Dearborn, Mich.

I am a member of the R. S. E. S.; also a regular reader of the Service Engineer through which you play a great part in helping us service men with our troubles.

VISOLEAK FINDS 'EM

WHOLESALE PRICES		CASE LOTS	
4 ounce bottle	$ 1.00	48 bottles	SAVE 10% ON CASE LOTS
8 ounce bottle	1.75	24 bottles	
1 pint bottle	3.00	24 bottles	
1 quart bottle	5.00	12 bottles	
1 gallon can	16.00	6 cans	

RED SPOT FURNISHES CLUE TO REFRIGERANT LEAK DETECTION

VISOLEAK is a finely-treated colored refrigerant oil which penetrates every nook and cranny of the system. The leak is indicated by a red stain – similar to the discoloration on a carburetor in which ethyl gasoline has been used. Can be used *safely* and *effectively* with any type of refrigerant. See your jobber today. If he has not stocked Visoleak write for complete information.

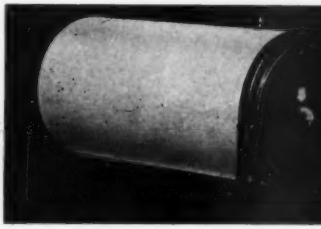
WESTERN THERMAL EQUIPMENT CO.
5141 ANGELES VISTA BLVD.
LOS ANGELES 43, CALIF.

NORMAL SUCTION PROCESS WATER COOLERS

6 to 25 gallon capacities.

Compact in design . . . can be mounted on floors, walls or ceilings.

Suitable for drinking water bubbler service, cafeteria or restaurant glass filler service.



DAY & NIGHT

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ATLANTA, GA.
J. E. Parker, 291 Peachtree, N. E.

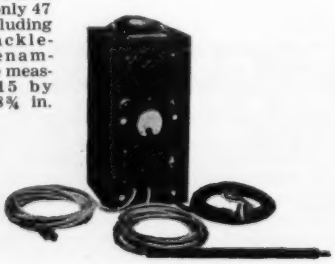
New and Improved Appliances

Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

High-Capacity Portable Insulation Tester

A SMALL portable insulation tester that can be carried in one hand, plugged into any 115-volt, 60-cycle outlet, and capable of supplying smooth variable test voltages from 0 to 2500 volts, has been announced by the General Electric Co., Schenectady, N. Y. The set has a capacity of 750 volt-amperes and will stand one-minute loads of 1500 volt-amperes without injury. It can be used to test electric apparatus ranging from the wiring for small appliances to Diesel-electric locomotives up to 600-hp.

The complete set, compactly built into a small steel case, consists of a dry-type, step-up transformer, variable autotransformer for smooth voltage control, indicating voltmeter, air circuit breaker with instantaneous overload trip, and control switches. Two 15-ft. shielded test cables, one with an insulated test handle and the other with a spring clip for grounding one side of the high-voltage circuit, and a 15-ft. supply cord with a connecting plug and ground clip, are also provided. The entire unit weighs only 47 lbs., including the crackle-black enameled case measuring 15 by 7¾ by 8¾ in.



This equipment gives highly accurate indication of test voltage, as the voltmeter is supplied from a separate coil on the transformer winding, and is arranged to give full scale readings at either 2500 or 1250 volts.

The set has several safety features such as the third conductor in the supply cord which grounds the steel case, a red signal lamp which remains lighted while the set is energized, and the shielded and grounded high-voltage test leads.

Unit Helps Preserve Freshness of Foods

REFRIGERATION units with cases molded of Tenite plastic help to preserve freshness of foods stored in refrigerators. With the use of this unit, illustrated below, food changes which are due to evaporation or dehydration are materially retarded, according to the maker. Dishes may be kept uncovered with a minimum of drying out, and food odors which contaminate other foods and the air in the refrigerator are neutralized, it is claimed. The perforated Tenite case is sturdy, good looking, and easy to install. It is simply hung in the upper portion of the refrigerator or placed against the rear corner of the top compartment.

Copper Plating on Aluminum

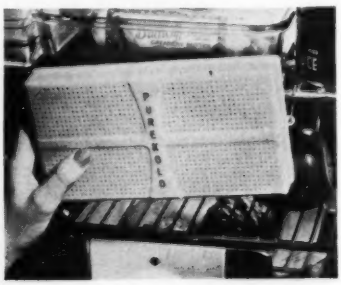
ADHERENT, uniform copper plating is now possible on aluminum and its alloys by means of a simple preparatory dip at room temperature, according to the Technical Process Div. of Colonial Alloys Company, Philadelphia 29, Pa. The dipping solution may be used in a steel, wood or ceramic container. There are no fumes and venting is not required.

Practically any copper electrolyte can be used as the plating solution except the sulfate types or those having a high degree of acidity. High-speed, bright-copper can be deposited with ease. Copper plating on aluminum brings greater utility to this light metal. A flash coat of copper eliminates the difficulty of soldering aluminum.

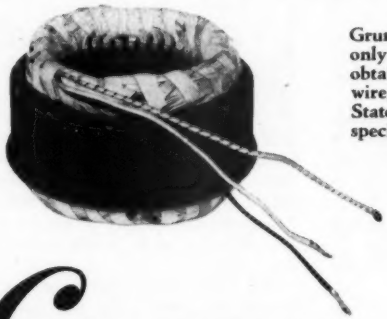
Aluminum also has a strong tendency to develop an insulating oxide coat, by mere air exposure. While aluminum itself is a good electrical conductor, this oxide coat growth on its surfaces reduces this conductivity considerably. When aluminum is copper plated this difficulty is overcome.

Copper plated aluminum serves as a base for further plating, such as nickel, cadmium, chromium, zinc, etc. When aluminum is copper plated and polished, it eliminates the usual dull aluminum finish which is so objectionable, as on pots and pans.

The process consists of a specified means of aluminum cleaning and preparation, followed by a 10- to 30-second immersion in a simple dipping solution at room temperature and then plating from the known copper plating electrolytes.



GENUINE GRUNOW RE-WOUND STATORS ELIMINATE COMPRESSOR BURN-UPS



Grunow re-winds its stators with only the highest quality materials obtainable—specially manufactured wire, purified tape, and insulation. Stators are dehydrated in Grunow specially constructed ovens and sealed in airtight containers while hot, assuring absolute freedom from moisture.

Write for name of your local distributor.

Send for Grunow Service Manual
Price 50c

Grunow
AUTHORIZED SERVICE, INC.
4315 W. Fullerton Avenue, Chicago, Illinois

FACTORY TESTED PARTS

GUARD AGAINST MOISTURE WITH

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ICE-X

TRADE MARK REG. U.S. PAT. OFF.

ICE-X quickly cures emergency freeze ups when ice forms at the expansion valve or capillary tube. Harmless to use. Great for Freon, Carrene, or Methyl Chloride systems...The dependable liquid anti-freeze.

ORDER FROM YOUR JOBBER OR—

EXCLUSIVE NATIONAL DISTRIBUTOR

THE HARRY ALTER CO. 1728 S. MICHIGAN AVE. CHICAGO 16, ILLINOIS

JOBBERS: WRITE FOR SPECIAL PROPOSITION!

NEW BEN-HUR DISTRIBUTORS

THE appointment of nine new distributors for their post-war line of "Ben-Hur" farm and home freezers has been announced by The Ben Hur Manufacturing Co. of Milwaukee, Wisc.:

Canfield Supply Company, 35-37 Ferry Street, Kingston, N. Y.

J. Geo. Fischer & Sons, Inc., Lapeer at Second, Saginaw, Mich.

Gould-Farmer Company, Inc., 1020 West Genesee Street, Syracuse 1. N. Y.

F. C. Hayer Company, Inc., 300 Washington Avenue North, Minneapolis 1, Minn.

Mead Farm Equipment Company, 1024 Dodge Street, Omaha 2, Neb.

Morley Brothers, Saginaw, Mich.

R. M. Wade & Co., 106 S. E. Hawthorne Blvd., Portland 14, Ore.

Youngstown Equipment Co., 111 Berkeley Street, Boston 16, Mass.

The York Supply Company, 530 North Main Street, Dayton, Ohio.

The new "Ben-Hur" line, now ready for post-war production, includes three different sizes of cabinets to meet varying capacity requirements. The accompanying illustration shows the new 12-foot size "Ben-Hur" Farm and Home Freezer cabinet.

CATALOG PROVIDES MANUAL ON FLEXIBLE METAL HOSE

A NEW engineering data file providing a complete manual on the installation of flexible metal hose, has been issued by Packless Metal Products Corp., New Rochelle, N. Y.

There are over sixty pages of photographs, specifications and line drawings. The latter having been developed out of the experience of the Packless field engineers to show the correct installation practices for getting maximum serviceability out of hose.

Sections are devoted to showing photographically how to assemble detachable self-sealing hose couplings and self-flaring fittings for copper and plastic tubing right at the job, thus effecting important savings.

The complete Packless line of hose constructions, as well as flange and coupling types, vibration absorbers, laundry and platen press units, and other specialties such as a flexible fastener for supporting and restricting vibration of rigid tubing and flexible hose, are illustrated and described.

NEW CATALOG SERVICE AVAILABLE TO JOBBERS

TO fill the increasing demand from refrigeration jobbers for parts catalogs, a "share the cost" Group Catalog Plan has been developed by C. R. Markham Advertising Agency, with the close co-operation of H. R. McCombs, president, of the National Refrigeration Supply Jobbers Association and manufacturers in the refrigeration industry.

The plan offers personalized catalogs to recognized jobbers in the industry on a share the cost basis. Complete details of the plan are explained in booklet form which are sent to jobbers on request.

Many jobbers have already placed orders for catalogs and work on the first issue is in production. Among the outstanding features of the plan is that it provides a means for refrigeration supply jobbers to buy professionally designed catalogs at moderate cost.

Complete details of the plan may be obtained by writing C. R. Markham, Advertising, 1362 Greenleaf Ave., Chicago 26, Ill.

SCHAFER ADVANCED BY HOTPOINT

AN announcement by R. W. Turnbull, president of Edison General Electric Appliance Co. (Hotpoint), states that Ward R. Schafer has been elected vice-president in charge of sales. The action was taken at a board of directors meeting March 8.

Mr. Schafer has been with Hotpoint since 1923 when he joined the company as an engineer in the commercial cooking division. Later he served as manager of product service, and was manager of the company's range division when war production interrupted production in 1941. During 1942 he gained a leave of absence from the company to superintend the construction of a 26 million dollar butadiene plant in Texas. He returned to the company as manager of the western sales region in 1943, later being placed in charge of all Hotpoint sales. He will continue in his headquarters at the company's Chicago offices.

A DREAM COME TRUE!

Here it is—the kind of a refrigeration tools, parts, and equipment catalog you've always wanted. Put out by AIRO, of course. Write for yours today sure!

Dept. A

AIRO SUPPLY CO. (NOT INC.)
WHOLESALE ONLY
2732 N. Ashland Avenue
Chicago 14, Illinois

IN STOCK

Prest-O-Lite equipment, including the Leak Detector Torch illustrated above. Order Thermal Catalog No. 9435. Immediate delivery—priority of AA-5 or higher required. List price $13.00. Thermal regular established discounts apply.

For these and other refrigeration items, try Thermal first. Write for our new 1945 catalog. Address Dept. A at your nearest office.

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HOME-PROVEN BY THOUSANDS
Many QUICFREZ Farm Locker Plants have already been in use for over 6 years.
Write for literature.
SANITARY REFRIGERATOR CO.
Fond du Lac, Wisconsin
SANITARY Quicfrez

SERVICE SHOP SPECIALIZES ON REBUILDING EQUIPMENT

ENDEAVORING to simplify and speed up the work of refrigeration service organizations, Refrigeration Maintenance Corporation, 321 E. Grand Ave., Chicago 11, Ill., has published a catalog of refrigeration parts exchange and rebuilding at stated flat prices. The catalog lists such parts as compressors, water valves, controls, float valves, condensers, evaporators, and complete high side reconditioning. Many parts and makes are in stock for exchange; thus avoiding delay for the service company in getting their customers equipment back in operation. Parts or equipment not stocked are handled on a repair and return basis.

The firm has been exchanging or rebuilding refrigeration equipment for the past 15 years. The shop is arranged to facilitate the handling of repairs, rebuilding, and testing of equipment before being again put into service or placed in stock for immediate delivery. An interior view of this shop is shown in the front cover illustration of this issue.

According to A. G. Weil, president, work is performed in the shop for many of the larger companies. About 16,000 square feet of floor space is devoted exclusively to refrigeration repairs. Mr. Weil states: "It is our belief that only complete rebuilding of a part will give new part satisfaction." After final test on each compressor, it is then dehydrated and painted ready for delivery.

S S S

GENERAL CONTROLS EXPANSION

IN ORDER to keep up with steadily increasing production schedules, General Controls Co., Glendale, Calif., manufacturer of electromagnetic control valves, announces the completion of another step in an expansion program that will soon put three acres of factory space under roof. The immediate expansion includes a processing plant, with 10,000 sq. ft. of space, in which the heat treating, anodizing, mechanical deburring, sand blasting and painting departments are housed.

In addition, a new, modern office building (illustrated) will soon be ready for occupancy. This building, which embodies several innovations in design and construction, measures 235x45 ft., and will house the executive offices, the administrative, sales, advertising and sales promotion departments. Upon completion, this move will make available an additional 10,000 ft. of badly needed factory production space.

While General Controls Co. is engaged almost entirely in essential war production, and will be for the duration, it is planning and building for a permanent post-war future.

As W. A. Ray, General Controls President, expresses it: "Necessity is the mother of invention; and the necessities of war have forced the development of many startling innovations which are bound to increase, when peacetime production is resumed, the enviable national acceptance our products have already earned."

S S S

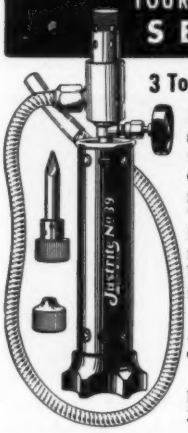
NEW WHOLESALE FIRM OPENS IN NEW ENGLAND

THE Supply Distributors Corp., a new firm organized to wholesale refrigeration parts and supplies in New England, has opened at 167 Brighton Ave., Boston, Mass. The officers of the company are Hillis Iams and Richard R. Seddon.

Mr. Iams, who will manage the new firm, has been active in the industry since the early 1920s when he operated his own business in southern Ohio. In 1935, he went with Mills Industries of Chicago, as field engineer and later as district sales manager in the Mills Condensing Unit Division, where he remained until the outbreak of the war. At that time he was located in Washington, D. C., where he represented Mills in procurement of government contracts until he recently resigned to form his own company. He is a member of the Refrigeration Service Engineers Society and the American Society of Refrigerating Engineers and is well known in the industry.

Dick Seddon, a native of New England, organized Miller and Seddon Company in 1927 and has been active in refrigeration circles of New England since. He was identified with Mills Industries both as field engineer and in the sales department of the Condensing Unit Division. He is a member of the Refrigeration Service Engineers Society and the American Society of Refrigerating Engineers.

Speed up
YOUR REFRIGERATION SERVICE



3 Tools in ONE... JUSTRITE

1. A gas leak detector for systems which use Freon, Carrene and other non-combustible Halide gases. 2. A light-weight "Power-Flame" soldering set for repairing connections or wiring. 3. A blow torch for "sweating" joints.

Quickly convertible. All parts built of the finest material.

Available now for priority orders. Ask your jobber.

JUSTRITE MANUFACTURING CO.
2063 No. Southport Ave., Dept. B-7, Chicago, 14, Ill.

SOME THINGS ARE
Confidential!

... especially the price you pay for parts, etc. The new **Kramer Catalog** contains *list prices* to protect your profits. Use it often.

FRED C. KRAMER COMPANY
212 N. Jefferson St. Chicago 6, Ill.

Check
DOOR GASKETS on Every Job
ARROW PRODUCTS
420 N. LA SALLE ST., CHICAGO 10, ILLINOIS

WRITE FOR CATALOG

Due to the paper shortage we will not issue a catalog in 1945.

SERVICE PARTS COMPANY
2511 Lake St. Melrose Park, Ill.

DUPONT RECEIVES AWARDS FOR WAR PRODUCTION

THE Du Pont Company, Wilmington, Del., has passed the 100-mark in "E" awards and stars for war production. In all, 33 plants have received the "E," and a total of 70 stars have been conferred.

First of the company's plants to receive government recognition of production achievement was the Carney's Point smokeless powder works, at Carney's Point, N. J., which on August 5, 1941, was given the Navy "E." This was before the award was made jointly by the Army and Navy. The plant has subsequently received five of the star awards.

Five awards have been won by the Indiana Ordnance Works, at Charleston, Ind., the Chicasaw Ordnance Works, Millington, Tenn., and the Repauno dynamite plant at Gibbstown, N. J. An additional award went to the engineering group for the construction of Chickasaw Ordnance. Four each have been given the Neoprene Plant at Deepwater Point, N. J., the Chemical Warfare Service plant of the Electrochemicals Department at Niagara Falls, N. Y., the Barksdale high explosives plant at Barksdale, Wis., the Seaford, Del., nylon plant, the Martinsville, Va., nylon plant, the Nylon Research Laboratory near Wilmington, Del., the Pompton Lakes, N. J., explosives plant, the Morgantown, W. Va., Ordnance Works, the Oklahoma Ordnance Works, at Tulsa, the Du Pont explosives plant at Du Pont, Wash., and the Wabash River Ordnance Works at Newport, Ind., one of which was for construction.

Eight other Du Pont plants have received three awards each, five have received two each and two have received one each. Six "E's" and five stars have been awarded plants of the Remington Arms Co., a Du Pont subsidiary.

S S S

FRANK PURCELL-TECUMSEH SERVICE MANAGER

TECUMSEH PRODUCTS COMPANY announces the appointment of Frank G. Purcell as their national service manager. Mr. Purcell is well qualified to head the service department through his experience in engineering and service work. After being graduated from Purdue University, he joined Frigidaire in 1926. With the exception of one year as assistant service manager of Gibson Refrigerator Co., he was with Frigidaire until his present appointment.

LIQUID CARBONIC MANUAL ON ICE CREAM CABINETS

RELEASE of a new 88 page service manual on ice cream cabinets and condensing units has just been announced by W. D. Jordan, Vice-President, Fountain-Cabinet Division of the Liquid Carbonic Corporation.

Published at this time to help ice cream men and service engineers keep the cabinets in operation for the duration, the new manual contains nearly a hundred illustrations and diagrams. While the diagrams and suggestions apply specifically to Red Diamond cabinets with detailed instructions for installing and servicing cabinets and units, much of the information is general.

Included in the manual are sections on: Wiring diagrams; National bureau of Standards installation instructions; Float valves, temperature controls and fan motors; Electrical trouble shooting; Exploded views of compressors, and Parts list.

Copies are available for service engineers and users of Red Diamond cabinets by writing to The Liquid Carbonic Corp., 3100 South Kedzie Ave., Chicago 23, Ill.

S S S

PALTZ NAMED ADV. MANAGER OF DETROIT LUBRICATOR

THE appointment of R. S. Paltz as advertising manager effective April 1, 1945, to succeed W. H. Hohmeyer, who becomes manager of the company's Oil Burner Controls Division, is announced by E. J. Doucet, general sales manager, Detroit Lubricator Co. Mr. Paltz, who has been connected with the advertising department for several years, has had close association with the promotional activities of all the company's products in the refrigeration, heating and industrial control fields.

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SERVEL, Inc. **Electric Refrigeration and Air Conditioning Division Evansville 20, Indiana**

GENERAL CONTROLS NAMES HESS HOUSTON BRANCH MANAGER

THE appointment of A. E. Hess as Manager of its Houston branch office has been announced by General Controls Co., Glendale, Calif.

A. E. HESS

Mr. Hess, who has had many years of experience in the engineering field for such firms as The Carrier Corporation and the Johnson Service Company, also spent several months on special engineering duty for the United States Navy. Joining General Controls in the Spring of 1944. his experience and ability in the automatic controls field earned for him this new appointment.

As Manager of the Houston Factory Branch, he will devote his entire time to serving users of automatic controls in the heating, refrigeration, aircraft and industrial fields throughout Southern Texas, Louisiana and Southern Mississippi.

S S S

ELECTRIC POWER EQUIPMENT CORP. ENTERS REFRIGERATION FIELD

ELECTRIC Power Equipment Corp., Philadelphia, Pa., manufacturers of switchgear for powerhouses and sub-stations, has reorganized preparatory to entering the field of commercial refrigeration on a nation-wide scale according to a recent announcement.

L. R. Lewis, founder and former president, becomes chairman of the Board. The new president is Marion E. Miller, who organized and directed the production program of the Philadelphia Ordnance District, A. S. F., under Brigadier General David A. Hausman. Before the war, Mr. Miller was assistant to the president of Peerless of America. Richard H. Shanahan has left the New York investment banking field to serve the company in his newly appointed position as treasurer.

The company today is operating two plants in Philadelphia, one of which will be devoted exclusively to refrigeration products when conversion is permissible.

COGGIN ADVANCED BY DETROIT LUBRICATOR

AS announced in the March issue of THE REFRIGERATION SERVICE ENGINEER, F. G. Coggin has been appointed manager of the Detroit Lubricator Company's Refrigeration Division effective April 1, on which date the resignation of J. W. Krall, former manager of the Division, became effective. Mr. Coggin has been with the Detroit Lubricator Co. for eighteen years in a sales administrative capacity and has been closely associated with the refrigerating industry for the past ten years.

F. G. COGGIN

S S S

ANNUAL REPORT LYNCH CORP.

THE annual report of the Lynch Corp., Anderson, Ind., including its wholly owned subsidiary Lynch Manufacturing Corp., shows that with return to production of standard products, sales volume was substantially the same as the previous year. New business being written far exceeds present productive capacity, consequently the backlog of unfilled orders continues to rise and while no appreciable improvement in volume or profits under today's restrictions are foreseen, any improvement in the manpower and material situation will be promptly reflected. Dividends of $2.00 per share were paid during 1944. The report is illustrated with pictures of the three plants at Anderson, Defiance and Toledo, Ohio.

S S S

KRAMER COILS ANNOUNCES THERMOBANK DEFROSTING

THE Kramer-Trenton Co., Trenton, N. J., has recently announced a bulletin number TV-845-AY covering the principle and operation of their Thermobank defrosting equipment for use on both high and low temperature applications. The manufacturer states that no water spray, brine spray, or electric heating element is necessary. A heat reserve is built up during the running cycle which serves as part of the defrosting cycle in conjunction with the hot gas from the compressor discharge.

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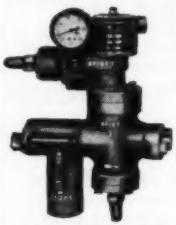

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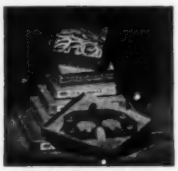

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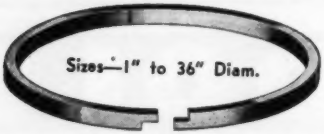

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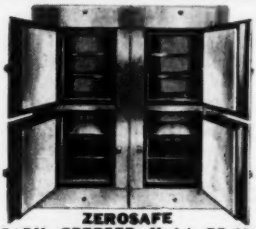

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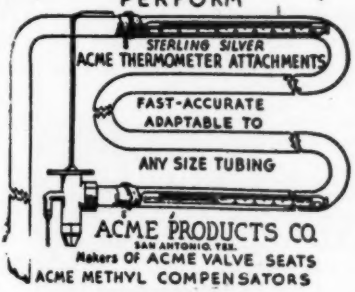

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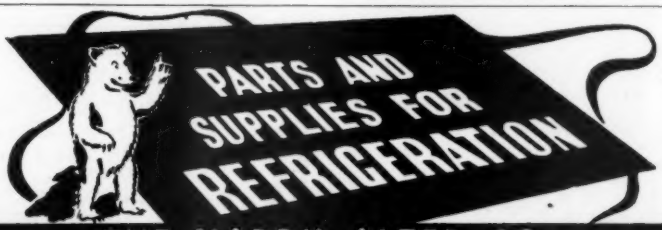

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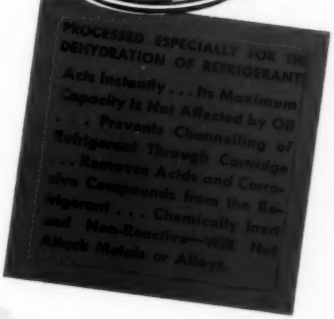
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